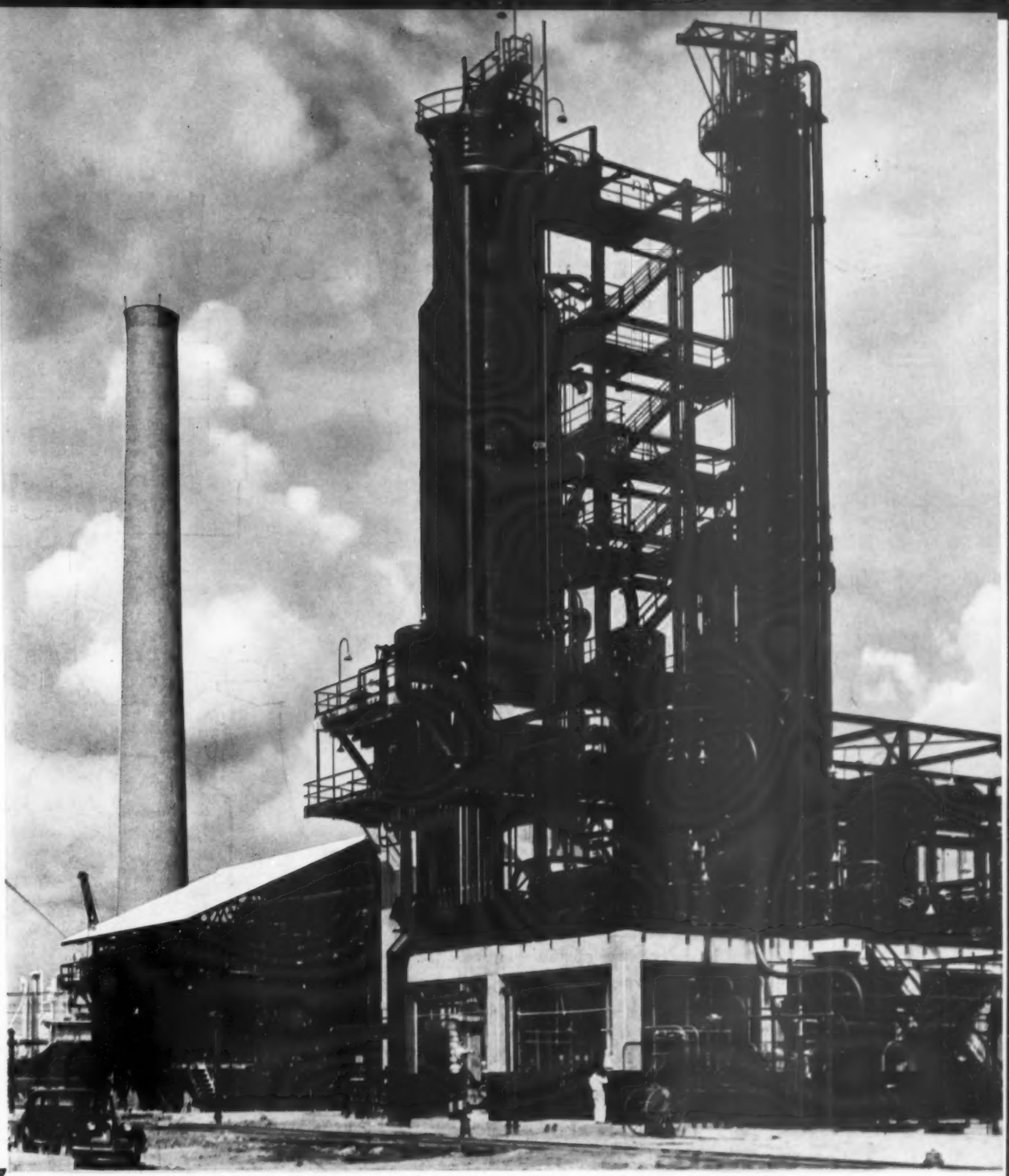
FIVE DOLLARS PER YEAR

FIFTY CENTS PER COPY



WORLD PETROLEUM

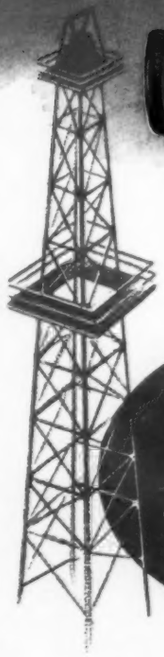
FEBRUARY, 1950

New Fields . . . More Wells . . .

Mack Trucks Help Find 'Em... Help Keep 'Em Flowing!

Two of the many Mack trucks, gasoline and diesel-powered, now operating in the Alberta oil fields.

• Dependable Mack trucks are top favorites in every phase of punishing oil field work. They've got that built-in "extra stamina" that makes the big difference when the going really gets tough. Powerful Thermodyne or Diesel engines! Mack's famed Balanced Bogie with the exclusive Power Divider on Mack six-wheelers! Husky frames of heat-treated alloy steel. Flexible rubber Shock Insulators! These and many other features are assurance of power and strength for the heaviest loads—traction and flotation for the most slippery mud or sand. Whether your hauling jobs take your trucks on or off the highway, you will find that Mack trucks have the capacity, power, strength and flexibility to put oil field equipment where you want it . . . when you need it . . . at lowest cost. See your nearest Mack branch or dealer for full information in terms of your particular operation.

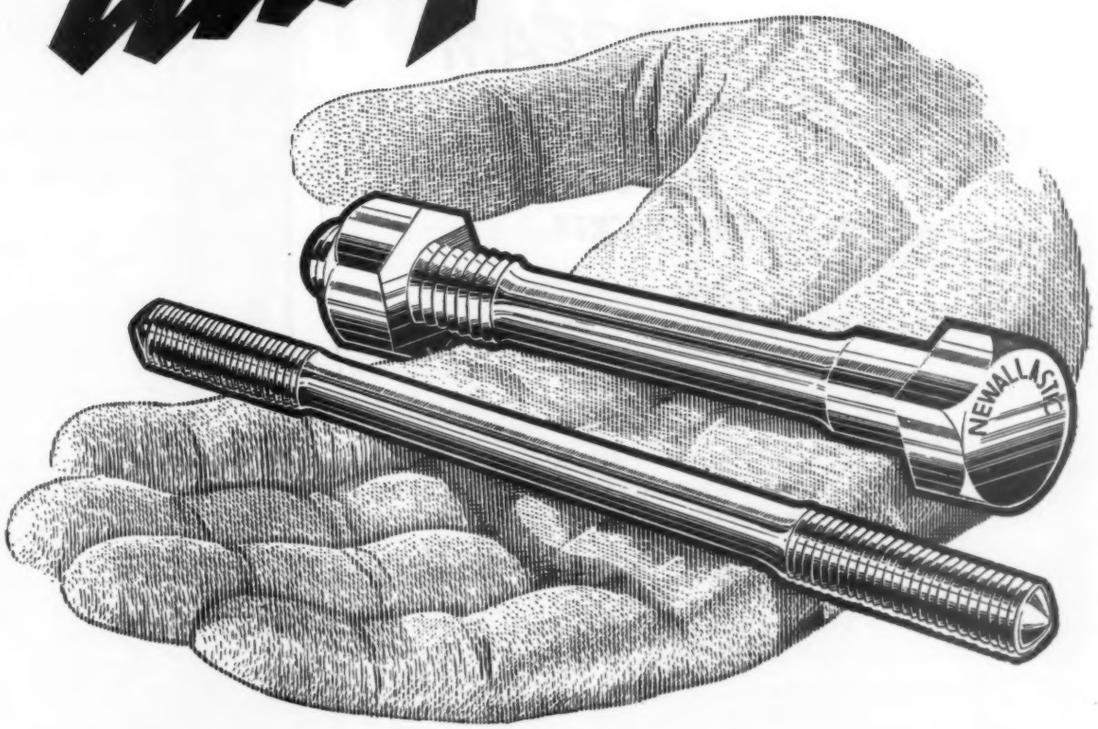


Built Like a **Mack** ...Outlasts them all

Mack Trucks, Inc.; Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N.Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Limited.

7880

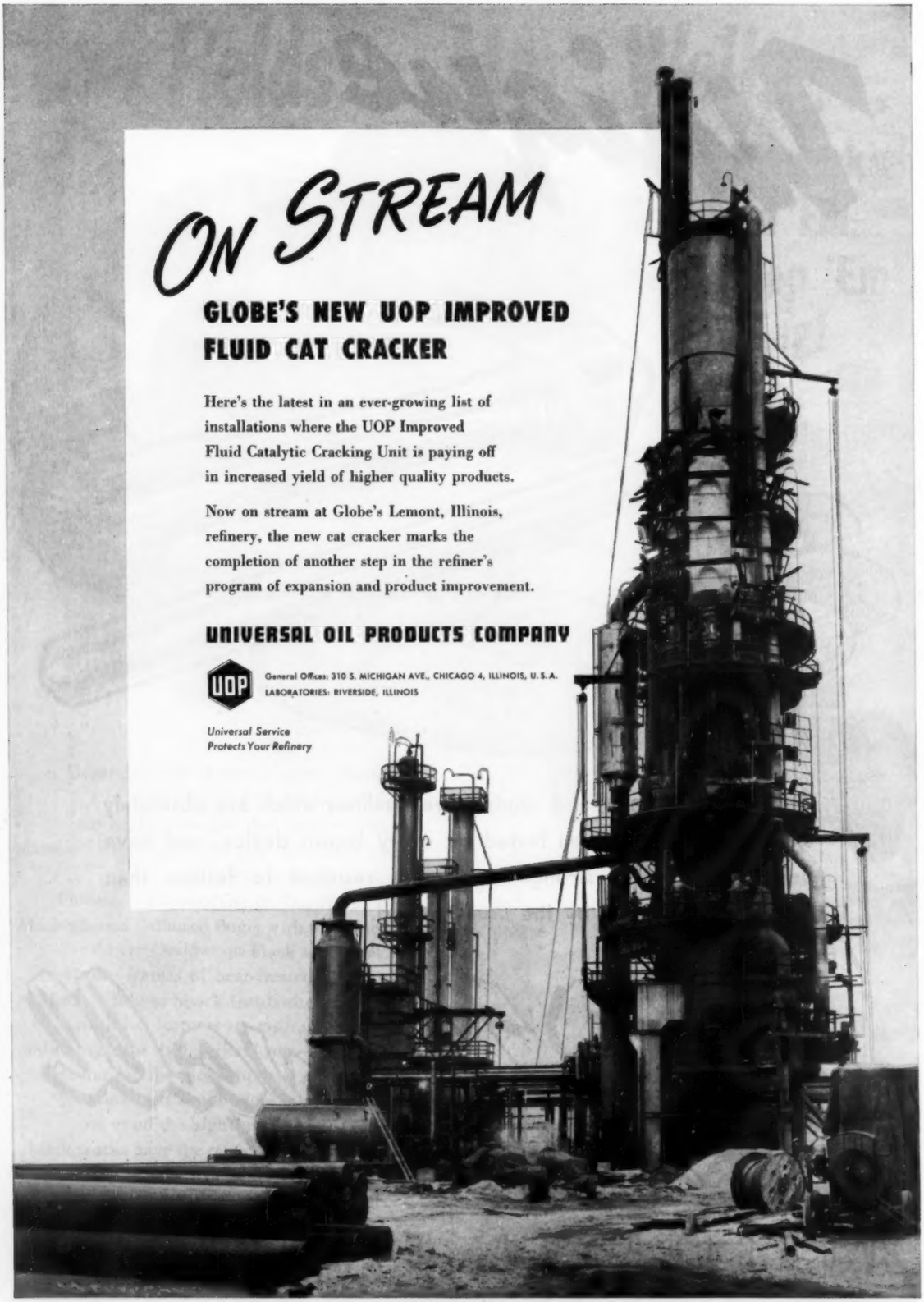
Unique



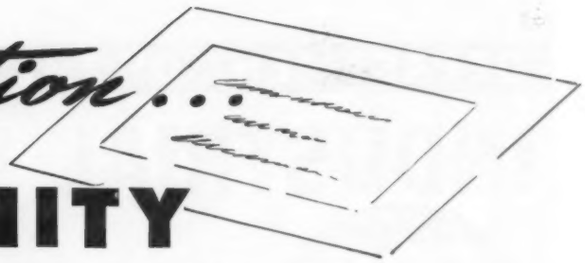
"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

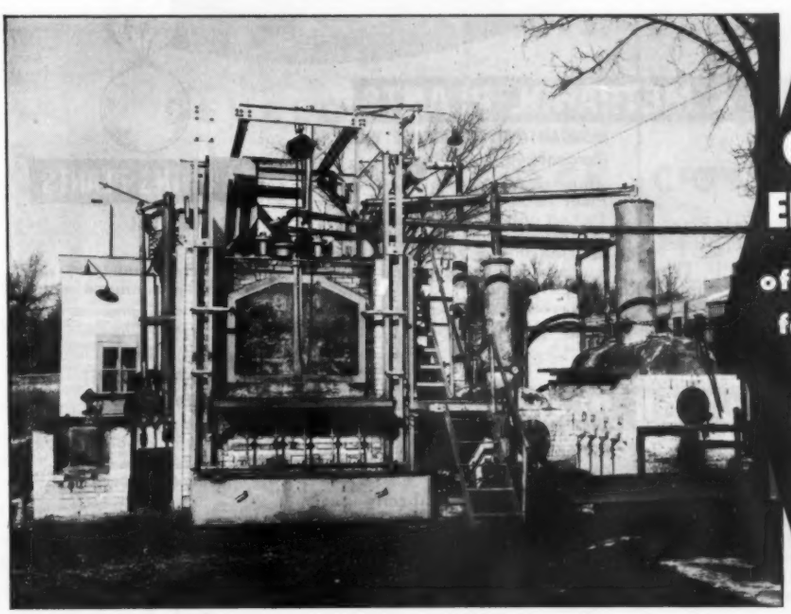
POSSILPARK GLASGOW · N


ON STREAM
GLOBE'S NEW UOP IMPROVED
FLUID CAT CRACKER
Here's the latest in an ever-growing list of installations where the UOP Improved Fluid Catalytic Cracking Unit is paying off in increased yield of higher quality products.
Now on stream at Globe's Lemont, Illinois, refinery, the new cat cracker marks the completion of another step in the refiner's program of expansion and product improvement.
UNIVERSAL OIL PRODUCTS COMPANY
UOP
General Offices: 310 S. MICHIGAN AVE., CHICAGO 4, ILLINOIS, U. S. A.
LABORATORIES: RIVERSIDE, ILLINOIS
Universal Service
Protects Your Refinery

An Invitation . . .
and an . . .
OPPORTUNITY



To every organization interested in disposing of its heavy residues in the broad, highly profitable Metallurgical Coke market.



CURRAN CARBONIZING & ENGINEERING CO.

offers the improved facilities of its Liquid Hydro-Carbon Coking plant (pilot) for commercial scale tests of your material.

The Curran Carbonizing Process, a flexible and economical method of high temperature coking, opens the door to the conversion of residuums to high quality METALLURGICAL COKE OR ELECTRODE CARBON.

A test of your material may well prove to be the key to greater profits for you. The assistance of Curran Coking Specialists is at your disposal in solving your coking problem (at actual cost of test to us).

Send Sample Today

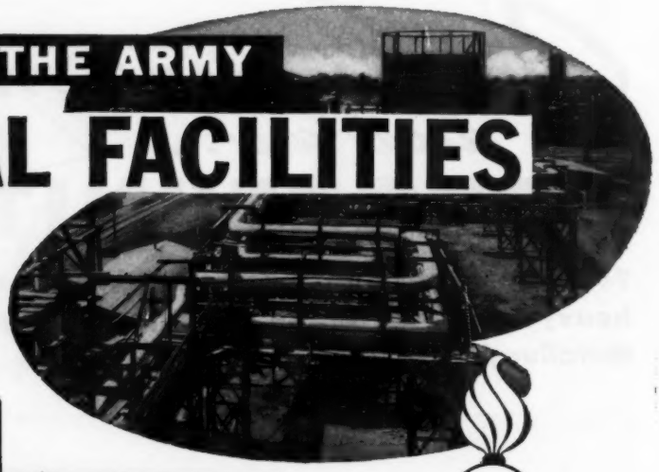
(Minimum 3 bbls. requested for preliminary analysis). Larger sample required for full scale, commercial demonstration. Your representatives welcome during the course of the test. Wire, write or phone.

Curran Carbonizing & Engineering Co.

314 N. BROADWAY • CEntral 8972 • ST. LOUIS 1, MO.

DEPARTMENT OF THE ARMY

INDUSTRIAL FACILITIES



FOR LEASE

AMMONIA & METHANOL PLANTS

SAN JACINTO ORDNANCE WORKS
Houston, Texas

This Anhydrous Ammonia Plant is now in operation. Facilities newly completed. Capacity per month: 2,100 tons of anhydrous ammonia.

District Engineer, Galveston District

MORGANTOWN ORDNANCE WORKS
Morgantown, West Virginia

Ammonia and Methanol Plant — Plant currently in ammonia production only. Capacity per month: 18,700 tons of anhydrous ammonia, or 4,000,000 gallons of refined methanol plus 5,000 tons of anhydrous ammonia.

Hexylamine—Capacity per month: 4,000,000 lbs. • *Formaldehyde*—Capacity per month: 5,200,000 lbs. Coke ovens not available.

District Engineer, Louisville District

SOLUTION PLANTS

JOLIET ARSENAL
Joliet, Illinois

Solution Plant — Capacity per month: 28,000 tons of ammonium nitrate solution as 100% ammonium nitrate in the form of 82% to 83% solution. Nitric acid facilities for this production are also available.

District Engineer, Chicago District

INDIANA ARSENAL
Charlestown, Indiana

Solution Plant — Capacity per month: 20,000 tons of ammonium nitrate solution as 100% ammonium nitrate in the form of 82% to 83% solution. Nitric acid facilities for this production are also available.

District Engineer, Louisville District

GRAINING PLANTS

RAVENNA ARSENAL
Apco, Ohio

Capacity per month: 23,000 tons of grained ammonium nitrate.

District Engineer
Louisville District

•

IOWA ORDNANCE PLANT
Burlington, Iowa

Capacity per month: 14,000 tons of grained ammonium nitrate.

Division Engineer
Missouri River Division

•

NEBRASKA ORDNANCE PLANT
Mead, Nebraska

Capacity per month: 25,000 tons of grained ammonium nitrate.

Division Engineer
Missouri River Division

All leases will be consummated through competitive bids. Sealed bids for the lease of these facilities will be received at the office of the Division or District Engineer having jurisdiction. Detailed information, arrangements for inspections and bid forms may be obtained from the Real Estate Division of the Division or District in which each plant is located.

FOR SALE

OHIO RIVER ORDNANCE WORKS, HENDERSON, KY.

This Anhydrous Ammonia Plant, capacity 6000 tons per month, constitutes a part of the National Industrial Reserve and has been designated for disposal subject to the National Security Clause.

All facilities, equipment and machinery are in excellent condition. The plant is currently being operated by the Solvay Process Division of Allied Chemical and Dye.

This plant is offered for sale under the provisions of Public Law 152—81st Congress, and is subject to priorities to other Federal Agencies.

Sale will be consummated through competitive bids. Sealed bids for the purchase of this facility will be received at the office of: District Engineer, Louisville District.

MISSOURI RIVER DIVISION
Corps of Engineers
Farm Credit Bldg.
Omaha 1, Nebraska

•

GALVESTON DISTRICT
Corps of Engineers
606 Santa Fe Bldg.
Galveston, Texas

•

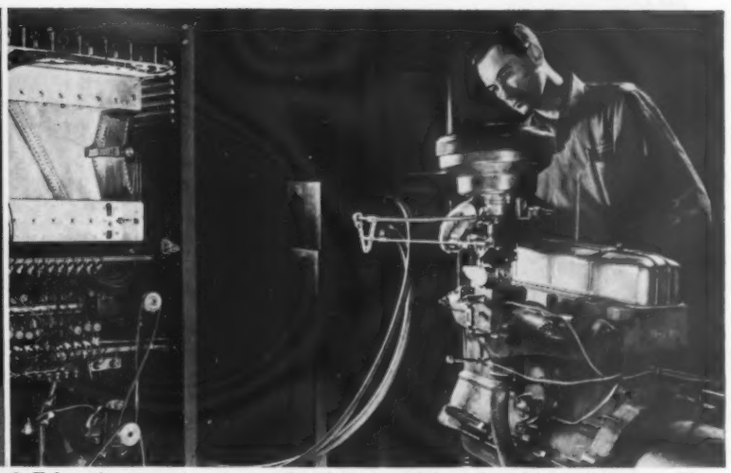
CHICAGO DISTRICT
Corps of Engineers
520 Merchandise Mart Bldg.
Chicago 54, Illinois

•

LOUISVILLE DISTRICT
Corps of Engineers
830 W. Broadway
Louisville 1, Kentucky

CORPS OF ENGINEERS U. S. ARMY WASHINGTON, D. C.

1. Chemical research on antiknock compounds has been a continuous program at Ethyl for 26 years.



2. Exhaustive research on new antiknock compounds is conducted in the laboratory. When results are favorable, these new fluids are proved in road test vehicles and in commercial fleets.

DEVELOPING AND PROVING "ETHYL" ANTIKNOCK COMPOUNDS OF THE FUTURE

THE manufacturer of antiknock fluid has an obligation to refiners to do far more than manufacture a given compound. He must constantly improve his product and keep it up-to-date in terms of the gasoline with which it will be blended to insure maximum quality when added to the gasolines produced by the petroleum industry and used in the engines produced by the automotive industry. Thus technical advances in these two industries must be matched by equivalent advances in the formulation of "Ethyl" antiknock compound.

How well the Ethyl Research Laboratories have lived up to this obligation is indicated by the numerous changes—five of them major improvements—which have been made in "Ethyl" antiknock compound during the twenty-six years it has been marketed.

More than tetraethyllead

While tetraethyllead is the principal ingredient of "Ethyl" antiknock fluid, it is only one of a number of ingredients. Determining the most suitable other ingredients and their most effective proportions has always been a major part of the research program of the Ethyl Laboratories.

To this research Ethyl has devoted thousands of hours of engine studies in the laboratory, over ten million miles of test vehicle operation at the Detroit and San Bernardino Laboratories, and over 40 million miles of commercial vehicle operation in large truck and bus fleets operating under a wide range of conditions in different parts of the country and under the close supervision of Ethyl engineers. The last major change in "Ethyl" brand antiknock compound was made only after more than 17,000 hours of laboratory engine tests and over nine million miles of road tests had confirmed the desirability of the change.

The aim of all this research is to give refiners the fluid which will enable them to raise the antiknock quality of their gasoline at the lowest possible cost . . . and to make sure that gasoline containing "Ethyl" fluid gives the best possible performance under the wide range of conditions to be met.

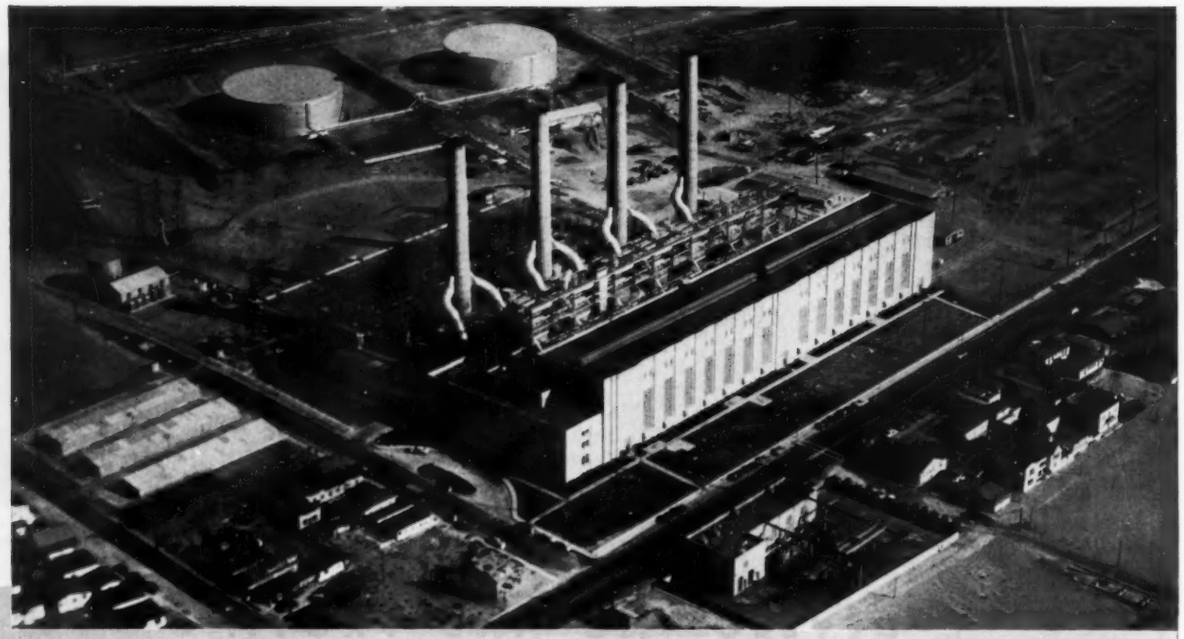
Serving the Progressive Petroleum Industry Through Research

ETHYL CORPORATION

RESEARCH LABORATORIES

1600 West Eight Mile Road, Detroit, Michigan 2600 Cajon Road, San Bernardino, California

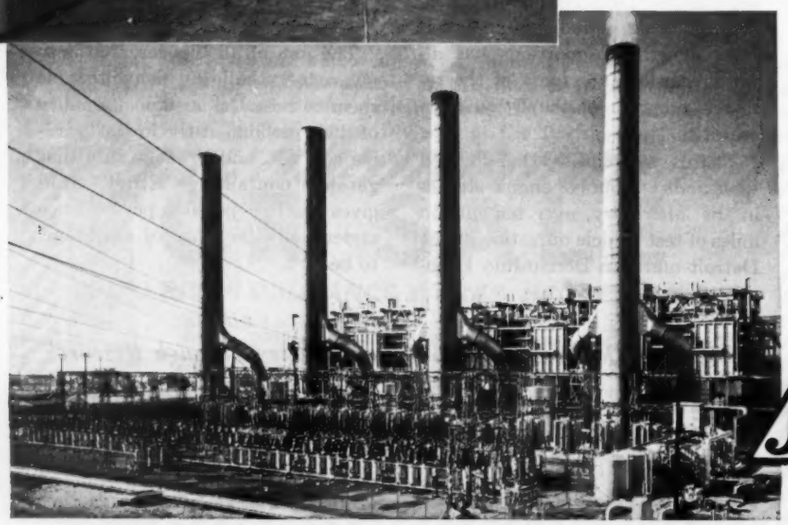
WORLD PETROLEUM for February, 1950. Vol. 21, No. 2. February, 1950. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 2 W. 45th St., New York 19, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies 50c.



HELPING TO MAKE THE WONDERS *of* SO. CALIFORNIA *more wonderful*

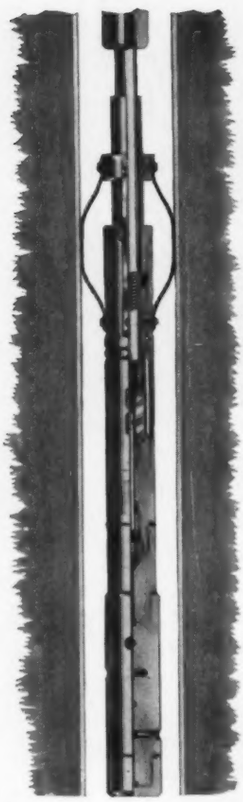
The 280,000 kw Redondo Steam Station was constructed to keep pace with the rapidly growing power demands of this region. Semi-outdoor design combines economy of construction with operating comfort and convenience and the entire structure has been built to resist the stress of possible earthquake shock. Unique is the provision for control of marine growth through thermal shock during periodic reversal of salt water flow in the two 2,000 foot intake and discharge tunnels which obtain condenser circulating water from the Pacific Ocean.

Stone & Webster Engineering Corporation designed and constructed the Redondo Steam Station for Southern California Edison Company.



STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.



A JOHNSTON

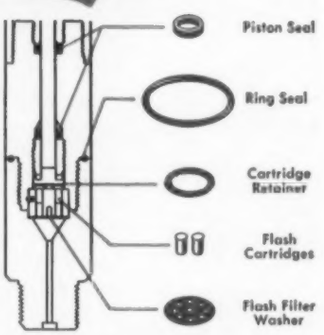
SHOOT-N-TEST

GUN PERFORATOR

Uses only these few expendable supplies...

THE FEW EXPENDABLE SUPPLIES illustrated are *all* that are needed for each Johnston Gun Perforating Job. After cleaning and drying the Firing Head and Perforating Gun Section, these few parts are easily replaced during normal reassembly. Individual Firing Chambers of each 4, 5 or 6-shot Perforating Gun Section are hand-loaded and need only a light portable hydraulic capper to assure precision alignment of the retaining cups over the firing chambers.

The Firing Head of the Johnston Gun Perforator requires no special tools or fixtures to effect complete reassembly. The Sealing Rings, Piston Seals, Flash Washers and two 32-calibre cartridges are negligible in cost and can be replaced right on the rig floor. Belly Springs need be replaced only when friction-worn beyond their ability to hold tension. Tension can be re-set before each run.



FIRING HEAD EXPENDABLE PARTS

Before you purchase any Gun Perforating Equipment check the outstanding advantages offered by the Johnston All Purpose Gun Perforator!

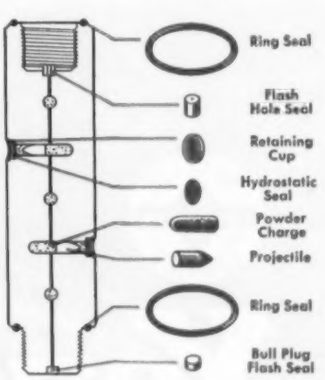
PERFORATE AND TEST IN ONE TRIP! To *both* perforate casing and test formation in one trip of tubing or drill string you simply connect the Johnston "SHOOT-N-TEST" Gun Perforator to your regular Johnston Tester and Pressure Recorder. First you fire the Gun Perforator and then take a formation sample immediately after perforating casing.

SAFE GUN PERFORATOR OPERATION! The Johnston Gun Perforator affords utmost safety in all phases of gun perforator operation. It will not fire until subjected to both in-the-hole hydrostatic pressure and top-hole manipulation by the driller.

PORTABILITY AND FLEXIBILITY! The Johnston Gun Perforator can be transported in the back of your regular field car! And after arriving at well location, you attach only the number of 4, 5 or 6-shot Perforating Gun Sections needed for that particular job.

EXACT POSITIONING IN PRODUCING ZONE! Accurate placement of the Johnston Gun Perforator opposite the zone selected for perforating is easily determined by your own pipe-in-the-hole tally. No rigging up of special measuring devices is necessary.

POSITIVE FIRE OF ALL PROJECTILES! The safe, fool-proof hydrostatic firing principle of the Johnston Gun Perforator Firing Head coupled with the flash-hole design of the Perforating Gun Sections insures positive fire of all projectiles.



GUN SECTION EXPENDABLE PARTS

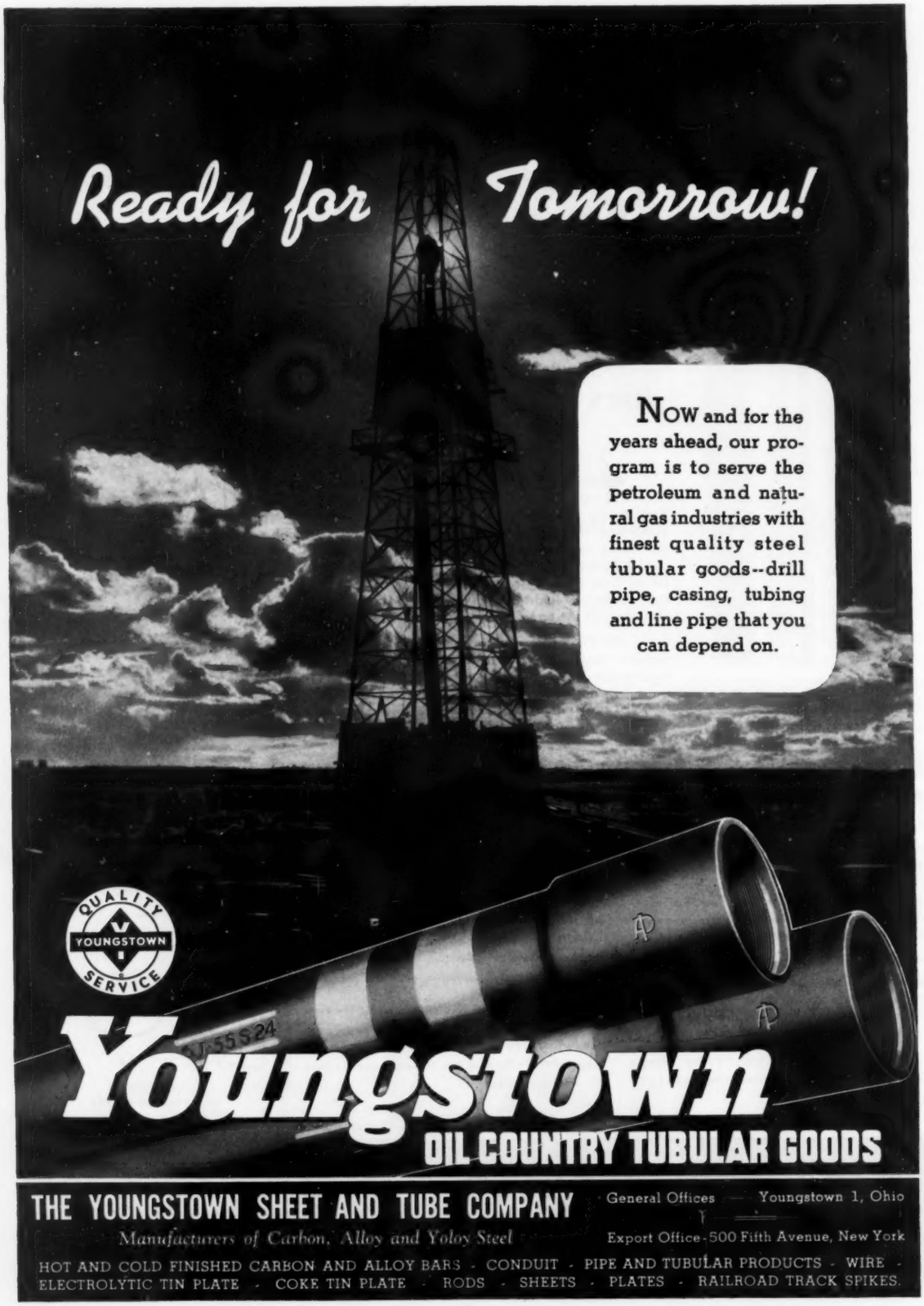
Write For New Descriptive Folder!

SHOOT-N-TEST Trademark FORMATION AND CASING TESTING JOHNSTON

M. O. JOHNSTON OIL FIELD EXPORT CORPORATION

EXPORT SALES

3035 ANDRITA STREET, LOS ANGELES 41, CALIFORNIA, U. S. A. • CABLE ADDRESS "MOJOC"


Ready for Tomorrow!
NOW and for the years ahead, our program is to serve the petroleum and natural gas industries with finest quality steel tubular goods--drill pipe, casing, tubing and line pipe that you can depend on.
QUALITY
YOUNGSTOWN
SERVICE
Youngstown
OIL COUNTRY TUBULAR GOODS

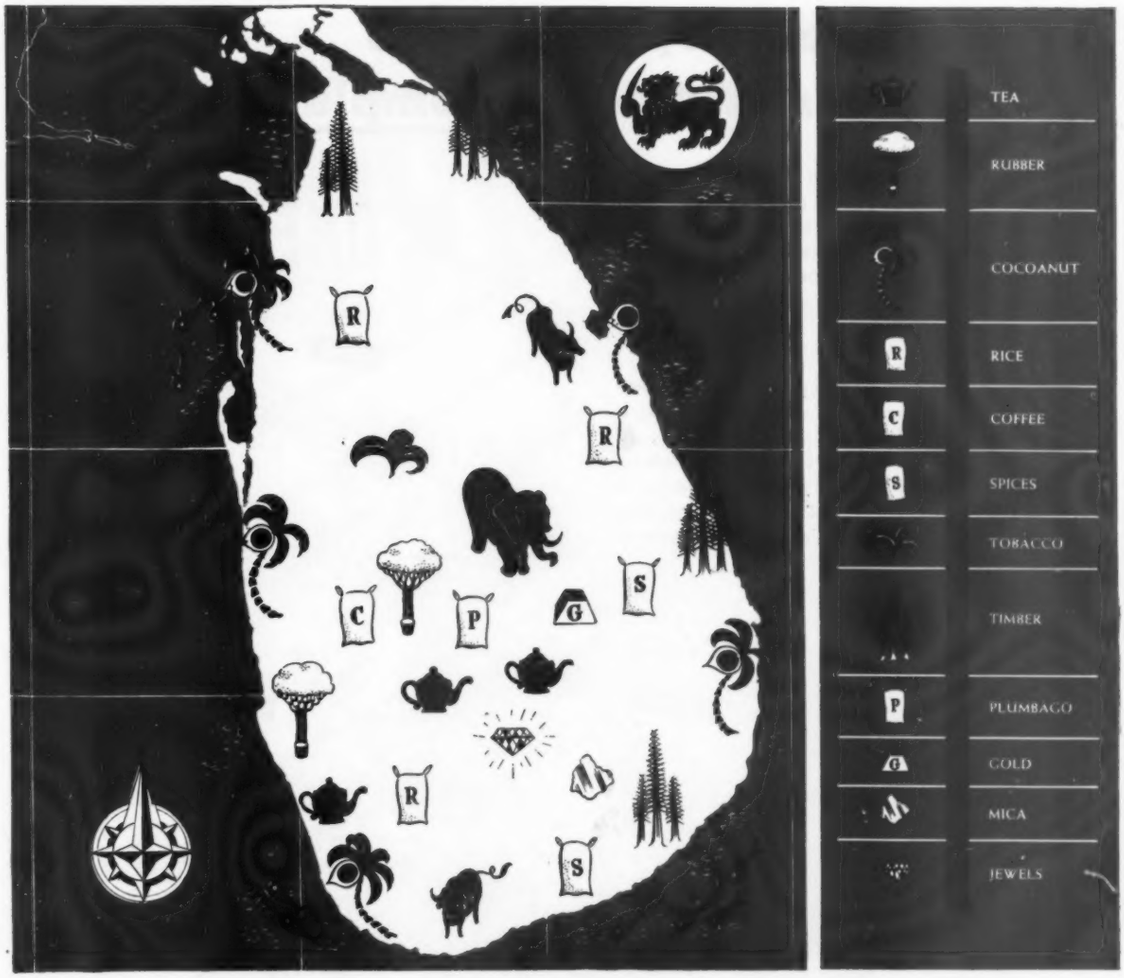
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices — Youngstown 1, Ohio

Export Office - 500 Fifth Avenue, New York

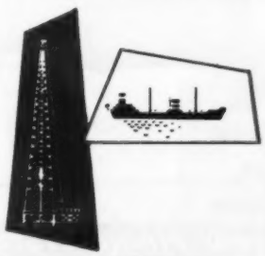
HOT AND COLD FINISHED CARBON AND ALLOY BARS - CONDUIT - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES - RAILROAD TRACK SPIKES.



DOMINION OF CEYLON

CEYLON . . . Bright gem in the Indian Ocean, this delightful island has long been admired for its scenery . . . its climate . . . its ancient temples. Ceylon's tea plantations are world-famous . . . its 25,000 square miles of fertile land also yield abundant rubber, cocoanut products, rice, coffee, spices, tobacco and timber . . . its minerals include plumbago, mica, gold and semi-precious jewels. Numbered among important post-war industrial developments in Ceylon are hydro-electric and irrigation projects, steel rolling mills, paper and fertilizer manufacture . . . as well as the expansion and modernization of other industries. Ceylon's 7 million people face the future with confidence.

Standard-Vacuum is proud of the part it plays in supplying the petroleum products so essential to the welfare and continued growth of Ceylon.



STANDARD-VACUUM OIL COMPANY

26 BROADWAY, NEW YORK 4, N. Y.

AUSTRALIA • BURMA • CEYLON • CHINA • INDIA • INDO-CHINA • JAPAN • KENYA
MADAGASCAR • MALAYA • MAURITIUS • INDONESIA • NEW ZEALAND
PAKISTAN • PHILIPPINES • PORTUGUESE EAST AFRICA • RHODESIA • SOUTH PACIFIC
ISLANDS • SOUTH-WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

For every refinery piping job
It's CRANE for complete selection

For Gland Oil and Cooling Water Lines, for example, Crane supplies all valves, fittings, pipe and accessories. But, whether for power, process or general utility service—Crane is the **One Source of Supply** complete enough to fill your piping equipment order. And no one can fill it better. For Crane serves you through a network of well-stocked, cooperating Branches and Wholesalers backed up by large factory stocks.

One catalog puts this complete selection at your finger tips. There's no need to shop around. Just place **Complete Responsibility** on Crane for materials . . . brass, iron, steel or alloys . . . and help yourself to better installations, avoid needless delays. Crane Quality is your assurance of **Highest Quality** in every piping item—of dependable performance from every part of your piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas
In Great Britain: Crane Ltd., 45-51 Leman St., London E.1, England.
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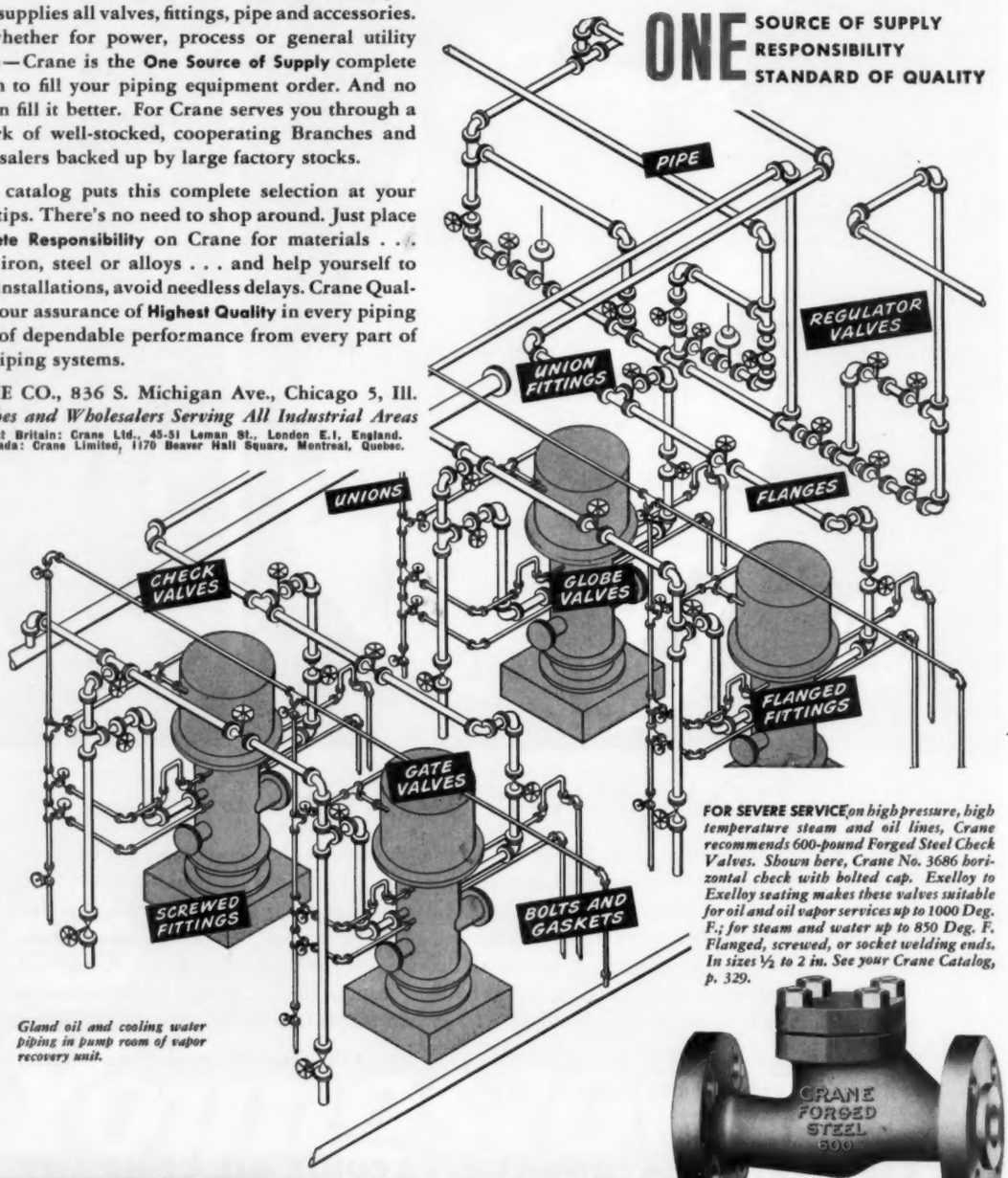
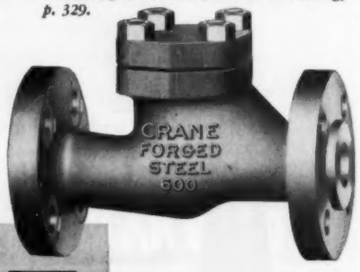
ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Gland oil and cooling water piping in pump room of vapor recovery unit.

FOR SEVERE SERVICE *on high pressure, high temperature steam and oil lines, Crane recommends 600-pound Forged Steel Check Valves. Shown here, Crane No. 3686 horizontal check with bolted cap. Exelloy to Exelloy seating makes these valves suitable for oil and oil vapor services up to 1000 Deg. F.; for steam and water up to 850 Deg. F. Flanged, screwed, or socket welding ends. In sizes ½ to 2 in. See your Crane Catalog, p. 329.*



EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

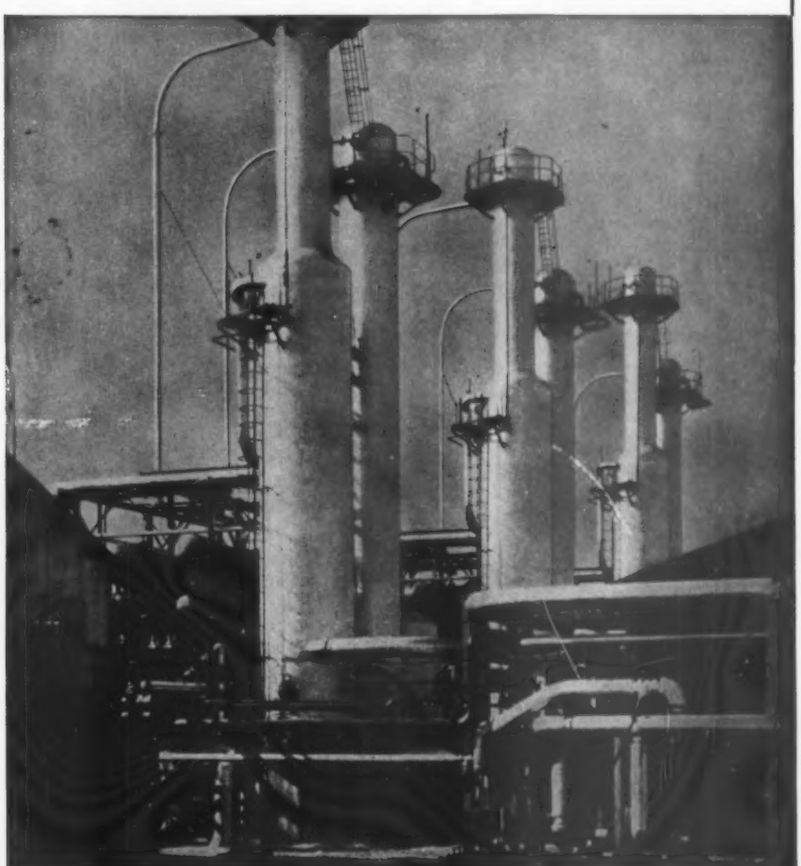
CRANE

FOR EVERY PIPING SYSTEM

NEWALLS

85% Magnesia Insulation

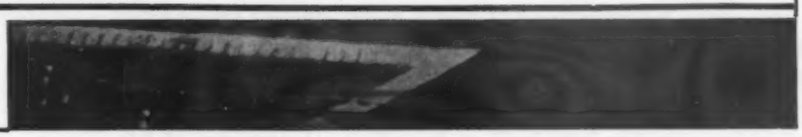
IS EXTENSIVELY USED ON THE CLASS OF WORK ILLUSTRATED. IT HAS AN EXTREMELY LOW THERMAL CONDUCTIVITY, IS LIGHT IN WEIGHT AND WILL MAINTAIN ITS EFFICIENCY THROUGHOUT THE LIFE OF THE PLANT. BEING EASY TO APPLY, ALSO INEXPENSIVE, IT IS IN ALL RESPECTS AN IDEAL COVERING FOR BOILERS, PIPES, HEAT EXCHANGERS, ETC. WRITE FOR OUR CATALOGUE "HEAT INSULATION" WHICH DESCRIBES ALL OUR HEAT INSULATING MATERIALS.



NEWALLS REGD BRAND PRODUCTS

NEWALLS INSULATION CO. LTD.

WASHINGTON STATION
CO. DURHAM, ENGLAND



What every new Tanker means to You

If you are a farmer it means bigger and better crops with better weed killers; constantly improved fuels and lubricants for trucks and farm machinery. And it means healthier, more productive livestock with effective insecticides.

If you are a housewife it means the comfort and convenience of modern heating and cooking . . . the lasting protection of better paints and preservatives . . . more efficient operation of the family car with modern gasolines and motor oils . . . health protection with new and better insecticides.

If you are a businessman it means quick, efficient transportation of goods; faster and more convenient travel by petroleum-powered automobile, train, ship, or plane.

The oil industry has been built on providing a better way of life through more and better petroleum products. It will continue to play a big part in the rising productivity essential to human progress and world peace.

The better you live, the more oil you use . . .

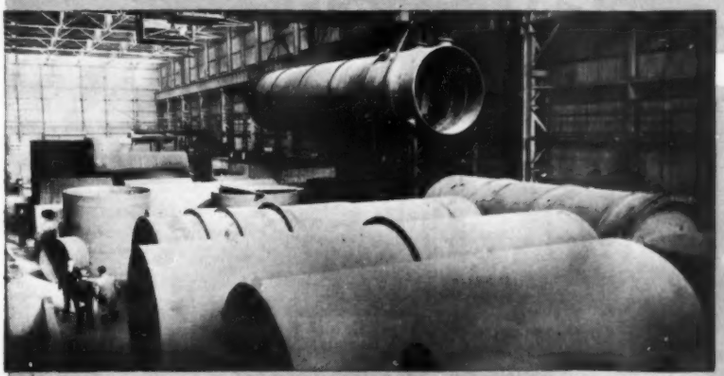
STANDARD OIL COMPANY (NEW JERSEY)

There is a wide gap, measured in terms of both time and distance, between a drawing-board in Britain and an oilfield in Venezuela.

Harvey's Works

where the plans are laid,

In the immediate Postwar period, there was a gap, just as vast, between the production and supply of plant for the growing Oil Industry.



the parts assembled,

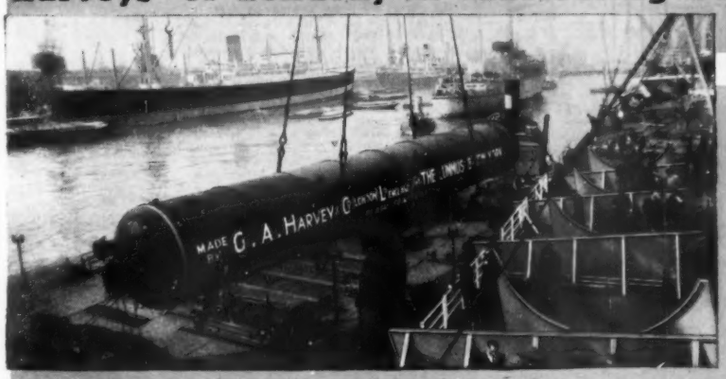
& the welding x-rayed.

But the need for Refinery Plant had been foreseen by Harveys of London; they instantly harnessed all the huge resources of their organisation

The column is transported,

with minor incidents,

and, by doing so, reaped the reward of their foresight and enterprise. Harveys of London, in fabricating such items as Fractionating Columns,



to be loaded at London Docks

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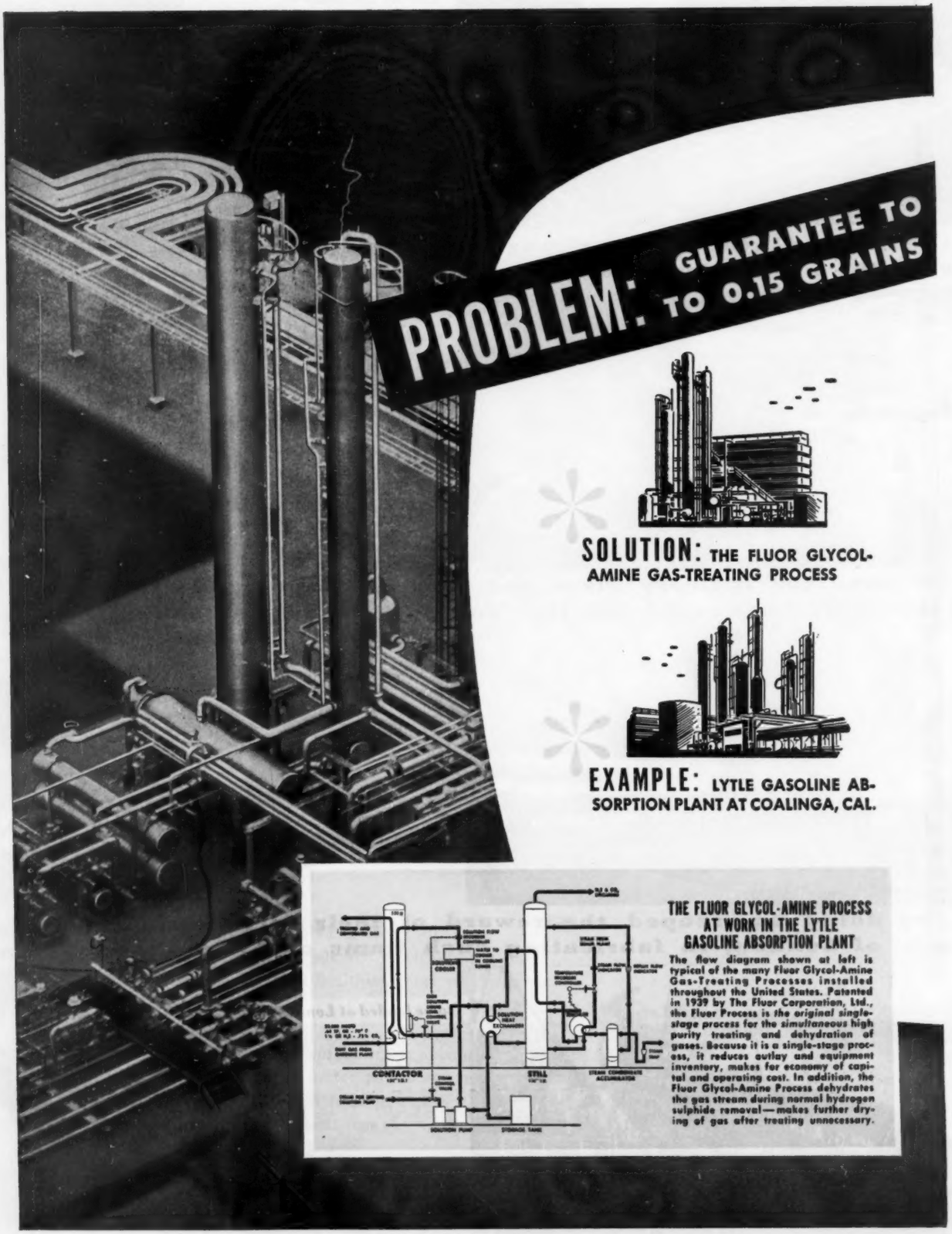

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EXAMPLE: LYTLE GASOLINE ABSORPTION PLANT AT COALINGA, CAL.

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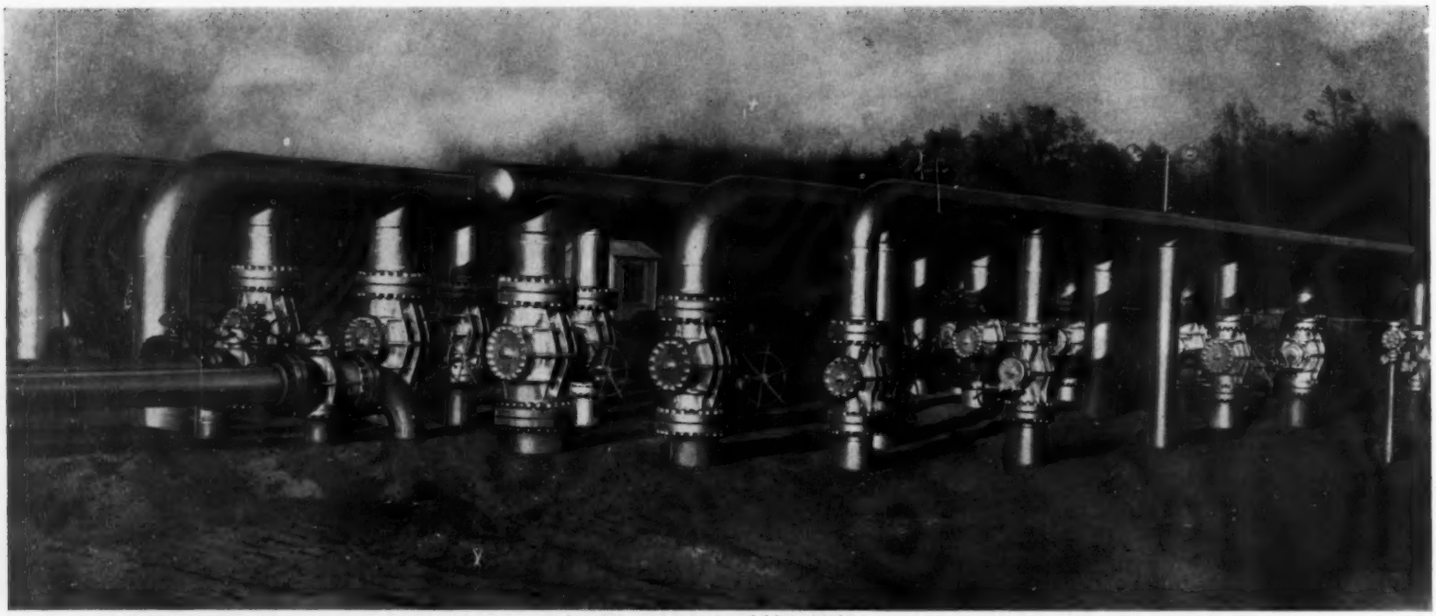

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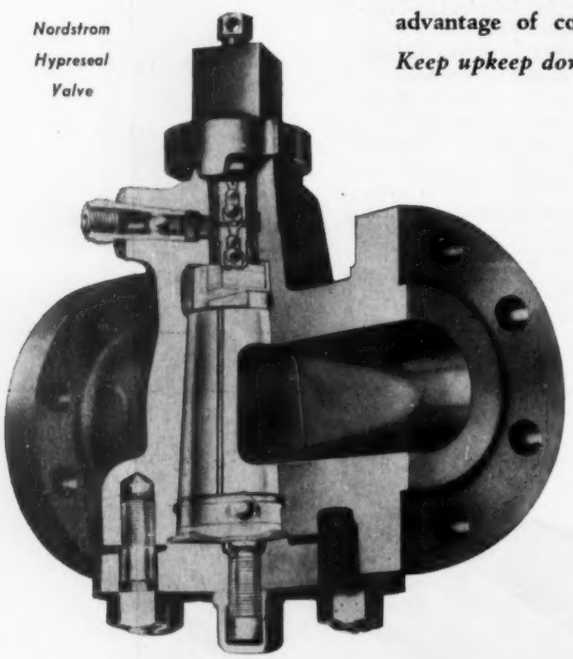

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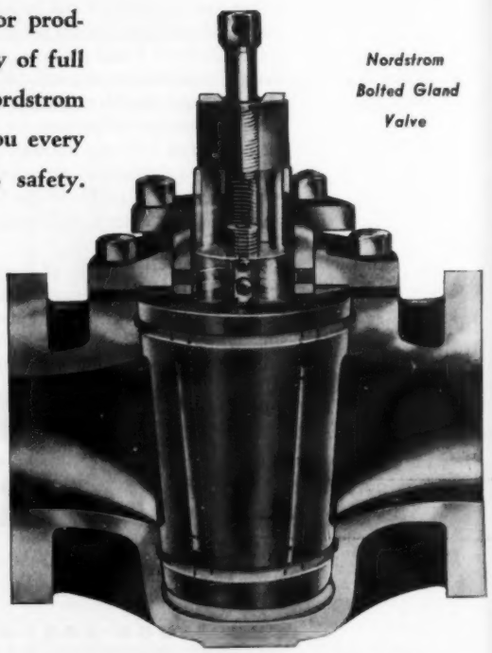

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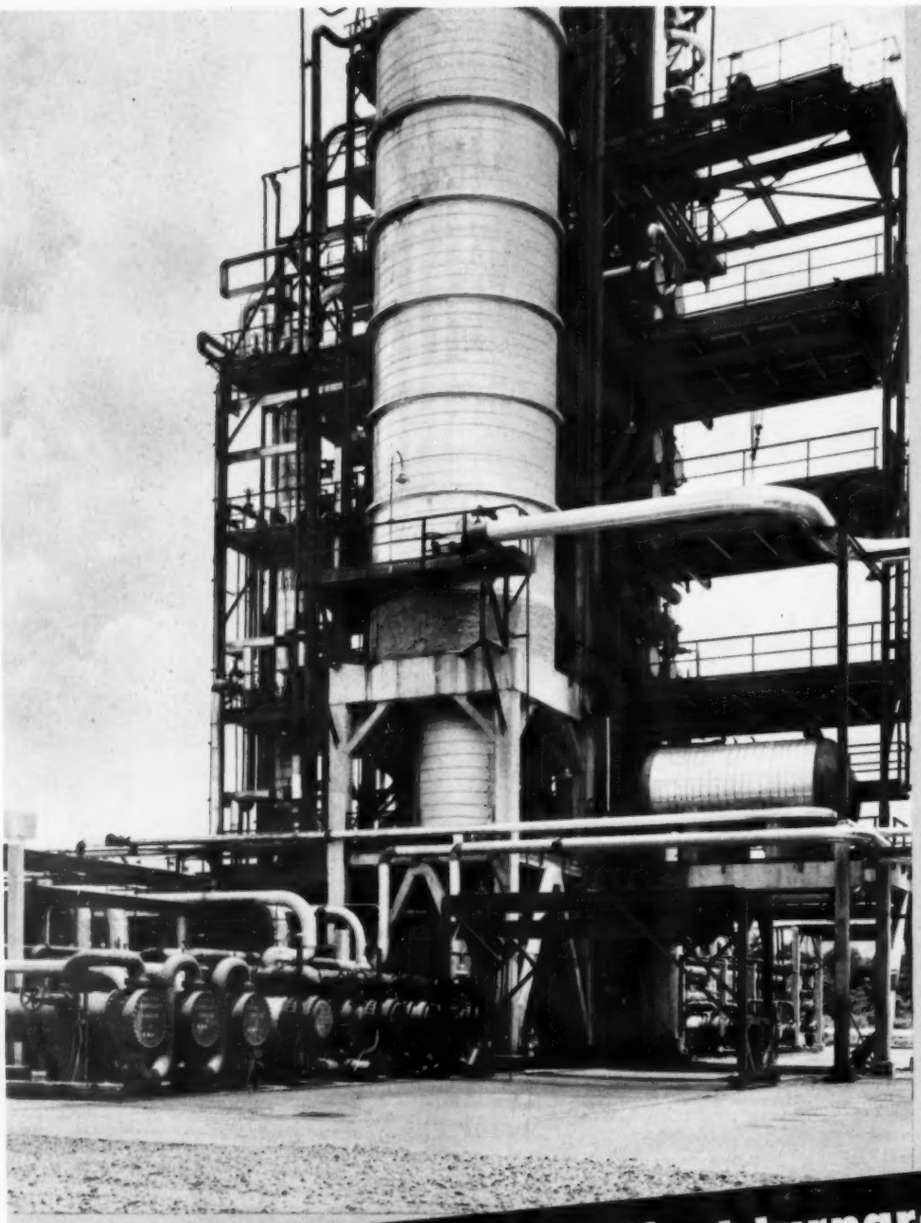

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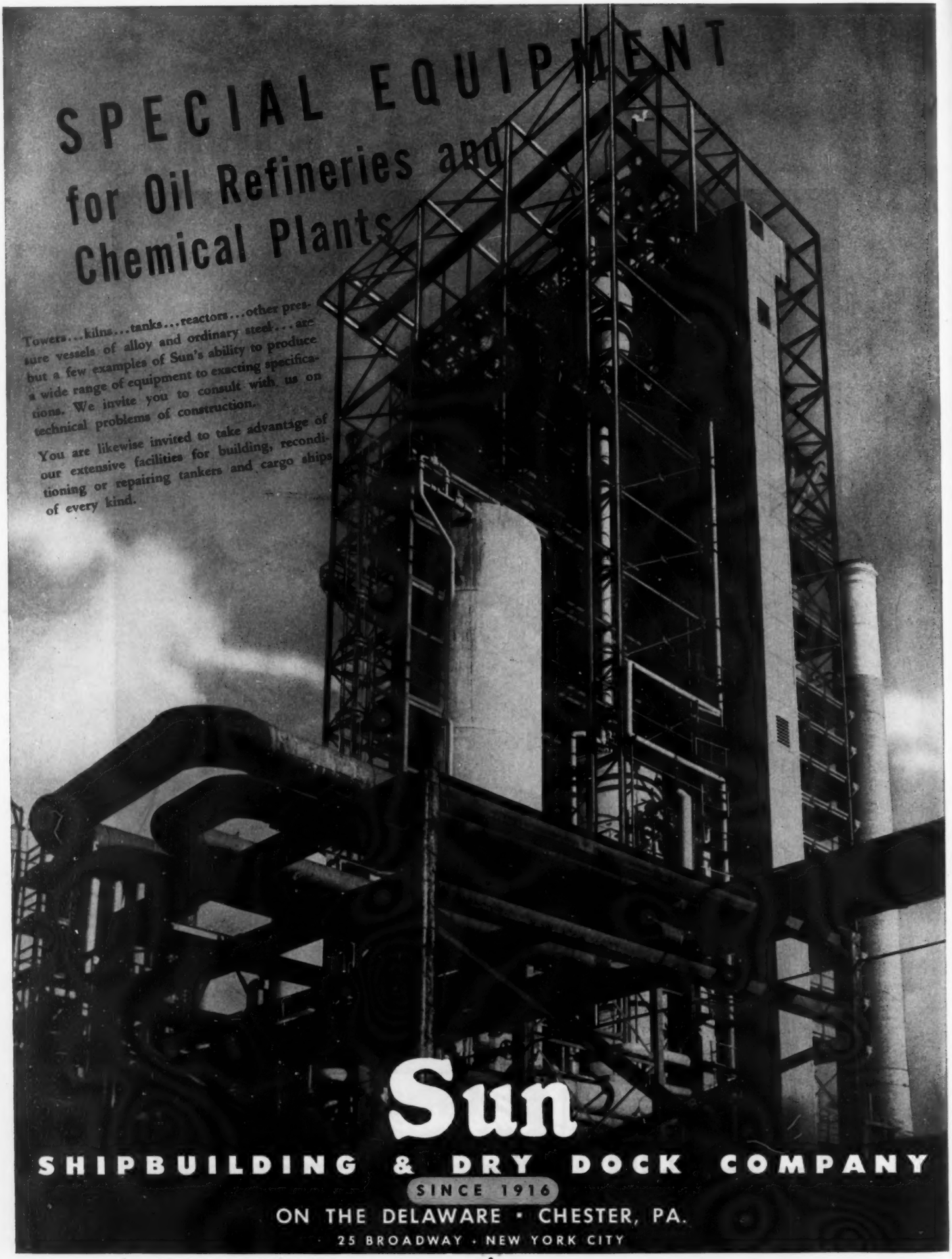
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E. W. Mayo
Editor

J. C. Chatfield
Managing Editor

Richard Sala
Art Director

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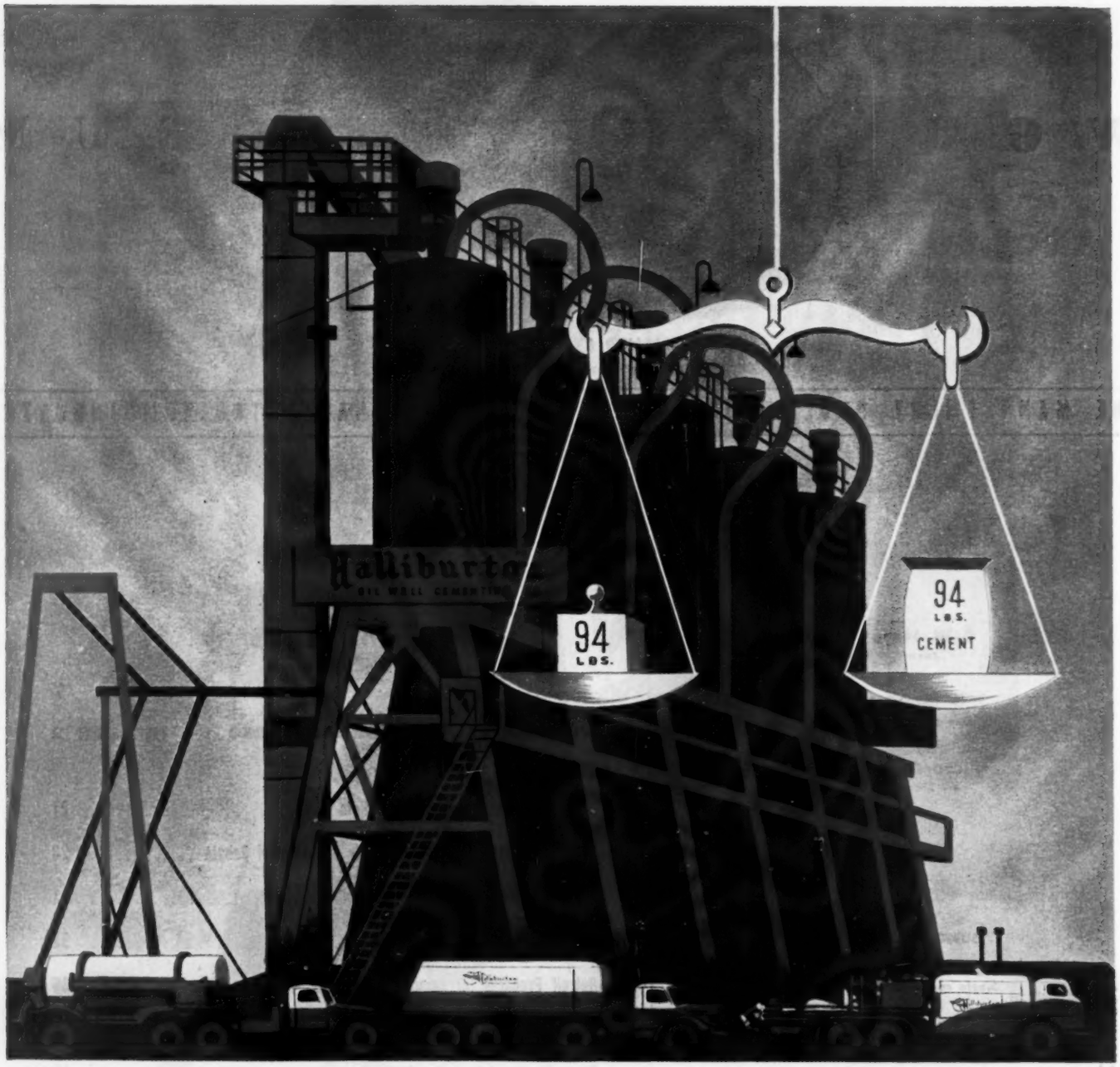
This Month's Cover

One of three atmospheric-vacuum topping stills recently built by Gulf Oil Corp. at Port Arthur, Texas. Each unit was designed to process 20,000 barrels daily of high sulfur crude. Kodachrome photograph by Robert Yarnall Richie for E. B. Badger & Sons Co., builders of the units. Color plates are reproduced through the courtesy of The Orange Disc, magazine of the Gulf companies.



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EDITORIAL

WORLD OIL TRADE NEEDS FREE MARKETS

OIL is frequently referred to by commercial experts as the most important single commodity entering into international trade. Whether or not one accepts the statement at full value there is no question that petroleum within the past few decades has risen to a leading place as a supplier of the power that multiplies man's energy, enabling him to amplify his production of useful commodities and thereby rise to a higher standard of living.

That fact was recognized in the framing of the European Recovery Program by making oil a basic factor in enabling the countries of western Europe to enlarge their agricultural production, improve their transportation systems and increase their industrial output in order that they might resume effective participation in the exchange of goods and services, which constitutes international trade.

This ultimate objective is something that should be kept clearly in view both by those who were responsible for initiation of this ambitious recovery plan and those who are in a position to benefit most directly from its operation. It would be unfortunate if the effort to obtain a temporary trade advantage should result in the postponement or defeat of the main objective.

International trade in oil differs from that in many other lines in that it deals primarily with a commodity found in widely separated parts of the world and serving markets—given conditions of open competition—in all quarters of the globe. Its products conform to standards that are of practically universal acceptance, so that the source of the material confers no special advantage so far as its utilization is concerned. For this very reason it is an extremely sensitive branch of commerce, and changes affecting supply or demand in any important division of the industry are quickly reflected in every other branch.

As a result of conditions arising from the war, Britain, like many other countries, has faced a heavy adverse trade balance and, in an effort to reduce this, has restricted imports and has sought to expand exports of numerous commodities including petroleum. Through regulations originally set up to meet a wartime emergency but now adopted as a permanent fixture, the British government is able to determine where and on what terms the oil produced by British companies shall be sold, and through its control of exchange it can decide what products can enter its own borders or other markets in which its control is effective. In the exercise of these powers it has entered into agreements with other nations for the supply of sterling oil to the exclusion of that from other sources, has embargoed all imports of fuel oil except that produced by British companies, and has reduced gasoline imports by one-third. According to reports which appear to be reliable, it has gone much further in certain directions, to the extent that a British company, operating in a British protectorate on a sterling basis, is not permitted to sell its oil for sterling because it is American owned; in another instance an American company offering to sell its product for sterling in a foreign country, is forbidden to do so unless the oil thus sold is from a sterling source and unless the proceeds from its sale are used to purchase goods for export to sterling markets.

While the legal right of a government to bar from its own markets any goods that it does not wish to admit is not to be questioned, the sweeping measures referred to are hardly in harmony with the principles of unfettered, multilateral trade and the undertakings of cooperation and non-discrimination agreed to by participants in the European Recovery Program and recipients of American aid. If persisted in, they are likely to throw the whole international oil situation into confusion and to precipitate conditions that will seriously retard economic recovery. At the same time awareness of prevailing currency problems and the changes that they create in world markets has led to the offer by American companies to conduct their operations in sterling areas on the same basis as British companies operating there.

Recognition of these facts provides a basis for mutually satisfactory understanding. The folly of any other outcome is so evident that one may feel certain that it will be avoided and that some arrangement will be worked out which will contribute to the improvement of Britain's financial position without undue disturbance of the established pattern of international oil trade.

The most desirable solution of the oil problem as it exists today would be the early ending of the restrictions now imposd upon consumption, the removal of trade barriers and the adoption of plans that will permit the liberal use of petroleum for the greater productivity of industry and an increased output of many kinds of goods to meet the needs of world markets. Such a course would lead to a rapid growth in consumption, not only in Europe but in many parts of the world, would remove whatever prospect of an oil surplus now exists and would contribute to the early attainment of the stronger economy and the sounder basis of world commerce which the present effort toward economic cooperation was intended to establish.

BRITISH OIL TRADING RESTRICTIONS STIR INTERNATIONAL DEBATE

In world markets American-controlled oil faces an uncertain year in 1950.

The difficulties lie largely in the fact that the normal pattern of currency convertibility has not yet been re-established. Early in 1950 there were four broad classes of markets:

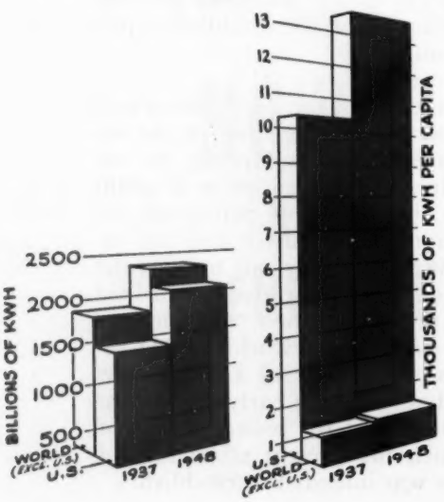
(1) United Kingdom, with its dominions, colonies and, generally, the sterling bloc, which together total 69 areas. On Dec. 17 last, official British statements required the replacement of American-controlled fuel oil and some gasoline with British oil, regardless of currency of sale. In other words American companies are not allowed by British Treasury rulings to sell their own oil for sterling.

(2) Egypt, Sweden, Yugoslavia, Japan, the Argentine and Brazil have signed bi-lateral trade agreements with Britain whereby British oil is assured preferential markets. As a result the sale of American oil is placed under severe or impossible handicaps.

(3) Other soft currency areas which have a substantial sterling credit which they wish to exchange for useful goods. The United Kingdom supplies oil against these sterling credits; Americans are not allowed by the British Treasury to sell American oil for sterling.

(4) The few hard-currency countries of the world including the United States. These may well be the battleground, with American oil companies forced to adopt policies which may have the result of depriving the United Kingdom of its present substantial dollar revenue from oil.

Per capita consumption of energy (expressed here as KWH) is much greater in the United States than elsewhere.



This article was written especially for WORLD PETROLEUM by an oil man who has had many years experience as a student of problems involved in the International oil trade. Editor.

In overseas markets the sterling area constitutes the largest area of petroleum consumption, and as British companies are the largest oil producers after American companies, and as sterling is the currency held by most oil buyers today, the British policy on oil is of top importance.

Britain and the entire sterling bloc, together with the non-sterling areas which hold substantial sterling balances, feel that they can no longer purchase oil for dollars or hard currency while there is sterling oil available.

The British Ministry of Fuel and Power stated in December last that on the basis of current prices, the net dollar outgo for 1950 would amount to $625 million for petroleum products. Of this $350 million would have arisen from operations of American oil companies in the sterling area, including the United Kingdom, and $275 million from worldwide operations of British oil. The former relates to oil which American companies sell in sterling areas—about 13 million tons annually. The latter is dollar element cost in producing and distributing about 80 million tons, of which more than half is marketed outside the sterling area for much needed foreign currency.

The British Ministry further stated that as the result of increased production and of restrictions on consumption, British oil companies expect to have in 1950 some surplus oil over and above what they will need to supply their established and restricted markets. The United Kingdom felt obliged to adopt a policy requiring oil importers to absorb this surplus before drawing supplies out of dollar sources. By this it was hoped to save from five to 10 percent of the above net dollar outgo in 1950 for oil.

The British government said it would discuss its plans with American companies so as to work the least hardship; also, measures by which American companies would adjust operating costs and procedures to minimize dollar outlay.

The program outlined for the British Isles is to start off with the total prohibition of dollar fuel imports and a reduction of one-third of the motor gasoline imports during the first quarter of 1950.

Other units of the sterling bloc took parallel action at the same time. India's government decided that all imports of dollar fuel oil into India for internal consumption shall be replaced by sterling fuel oil. India interprets dollar oil as being any oil imported by United States-controlled companies, except what such American companies may have bought from British-controlled companies.

Australia's new government, elected on a promise to do away with gasoline rationing, is now holding discussions with oil companies doing business in Australia to determine whether all gasoline, including the increases resulting from the end of rationing, may be secured from sterling sources.

The Crown Colony of Kenya, East Africa, stopped all imports of American-controlled fuel oil but advised that British companies are not expected to have any appreciable surplus in the near future of products other than fuel oil. Assurances were given by the British companies that they are, in principle, willing to sell their surplus fuel oil to American-controlled companies if these arrangements are left to commercial negotiations.

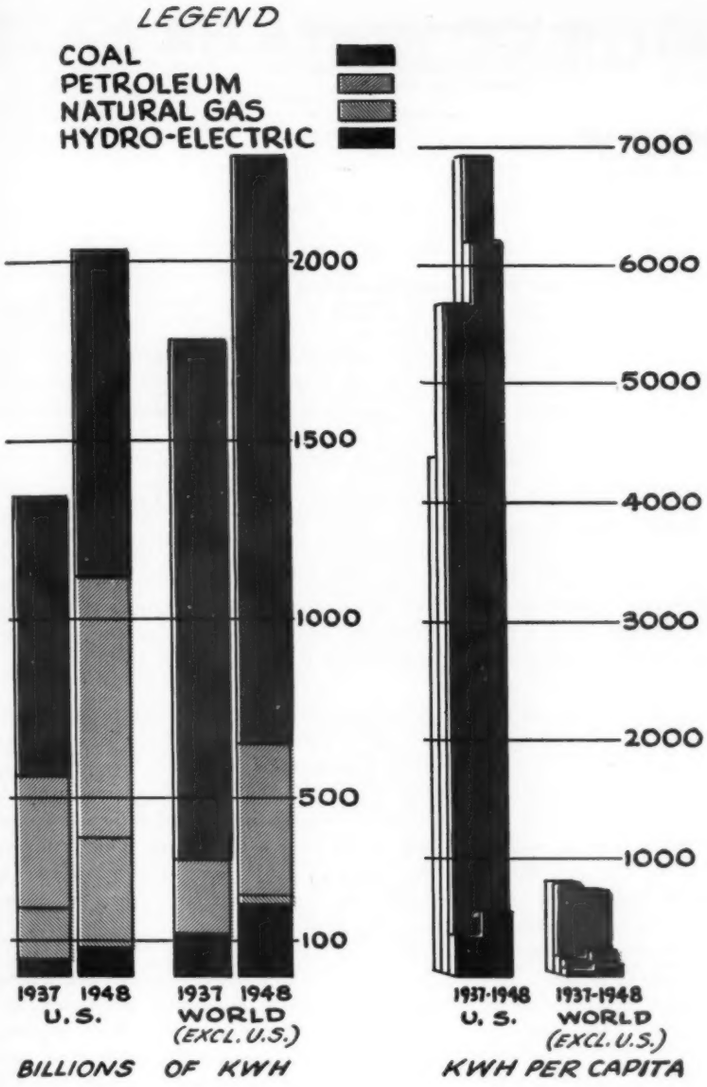
Table 1—1949 Sterling Area Consumption

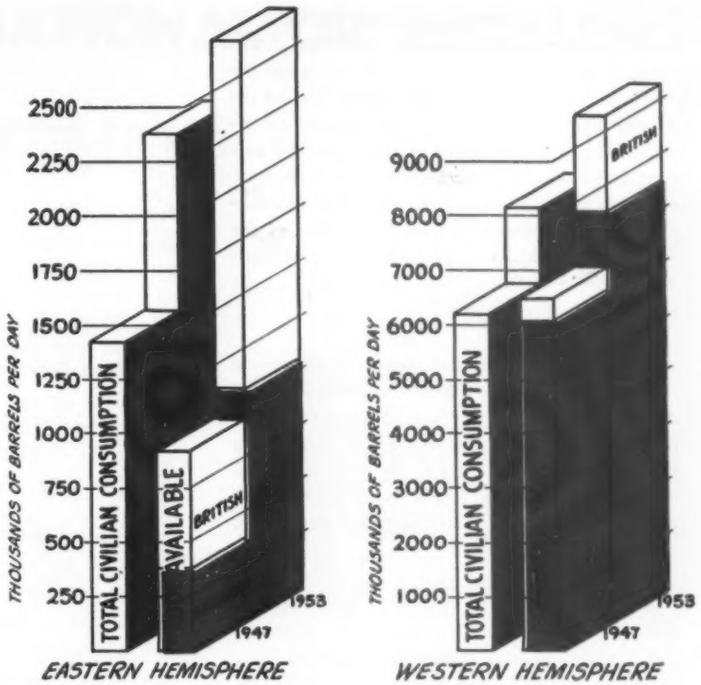
	Barrels Daily
England	363,318
Ireland	12,353
Aden	17,375
Egypt	81,863
India	78,685
Pakistan	11,134
Ceylon	13,101
Malaya	22,444
East Africa	13,334
South Africa	50,052
Burma	5,608
British Borneo	1,526
Australia	77,304
New Zealand	18,981
Total Consumption	767,078
British Production Eastern Hemisphere	911,100
British Imports of British Production from Western Hemisphere	170,000
Total British Supply Eastern Hemisphere	1,081,100
Surplus British Supply to Sterling Area Consumption	314,022

The British program announced to the oil companies on Dec. 17 was to become effective the first of January, but recognizing the need for position-

Table 2—Power Consumption

	1937		1948	
	Billions of Kwh	000's of Kwh per Capita	Billions of Kwh	000's of Kwh per Capita
U. S. Consumption	1,337	10.4	2,033	13.7
World Consumption (excl. U.S.A.)	1,781	.9	2,298	1.0





Analysis of sources of energy in the United States and elsewhere throughout the world shows a very rapid increase in petroleum as compared with coal and water.

The Eastern Hemisphere, which has been depending on the West for oil in past years is expected to have an available surplus of oil by 1953.

Table 4—Eastern Hemisphere

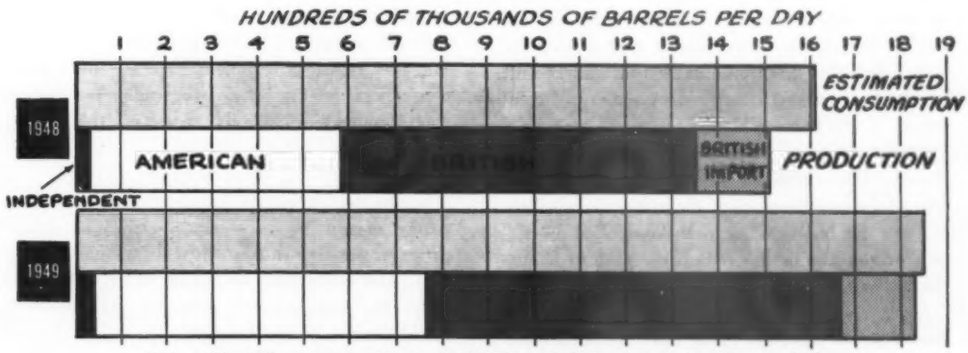
(Thousands of Barrels Daily)

	1947	1953	% Increase
Total Civilian Consumption	1,409.7	2,380.6	68
Total British Crude Available	729.5*	1,593.5	118
Total American Crude Available	654.1*	1,085.1	66
* Includes production from Western Hemisphere.			
World Total			
Total Civilian Consumption	7,628.7	10,544.6	38
British Production	1,048.9	2,194.7	109
American Production (U. S. & Foreign)	6,341.7	8,750.9	38

ing ships and altering refinery runs to diminished requirements, an easement has been given of some several weeks.

Britain states this is a short-term policy, solely to save essential dollars, and asserts that it has no long-time effect on the pattern of oil distribution by British and American companies.

With every justification, Britain initially held down the demand of her transportation and industry to the bare minimum for the essential purpose of saving dollars. It would appear that subsequently demand has been held back close to the point where British oil could satisfy most of the demand, with dollar oil purchased only to satisfy that portion of the restricted British consumption which British oil could not yet fully satisfy. Americans fear that as British-controlled production increases, artificial currency devices will be used as a control on demand, which will allow demand to rise only commensurate with the expansion of British production.



Eastern Hemisphere consumption in both 1948 and 1949 was greater than available local production plus British oil imports from the Western Hemisphere.

Table 3—Types of Fuel

	U. S. Consumption				World Consumption (excl. USA)			
	1937		1948		1937		1948	
	Billions of Kwh	Kwh per Capita	Billions of Kwh	Kwh per Capita	Billions of Kwh	Kwh per Capita	Billions of Kwh	Kwh per Capita
Coal	730	5,659	922	6,205	1,449	776	1,663	742
Petroleum	409	3,171	718	4,832	201	108	433	197
Natural Gas	153	1,186	309	2,079	...	...	31	14
Hydro-Electric	45	349	84	565	131	70	201	91
Total	1,337	10,365	2,033	13,681	1,781	954	2,298	1,044

Economists believe that there would be no surplus oil, once the legitimate requirements of a higher living standard for the rest of the world have been met. They believe that the world, outside of the United States, has now available only a fraction of the power by which its industrial production can be increased. The present output per worker, even in the industrialized areas, is abnormally low, because manpower and obsolete sources of power are the main producers of goods in many areas.

This age is known as the Oil Age. Its low cost, ease of transportation and handling and ready

availability in great volume make oil the most feasible and economical source of power at this time. Consumption of all forms of energy in the rest of the world lags further behind that of the United States than was the case prewar. Overseas energy consumption has risen only 10 percent in the past 11 years, while United States consumption has increased 33 percent. The relationship of United States consumption to that of the rest of the world has accordingly increased from 11 to one in 1937 to 13 to one in 1948 in per capita ratio. (See Table 2.)

A greater availability of power is absolutely necessary for the truly efficient utilization of raw materials and labor by which the eastern hemisphere may place its economy on a self-supporting basis. As mentioned before, the only source of energy which is readily and cheaply available for the multiplication of man's output is petroleum. (See Table 3.)

As evidence against the existence of any real surplus of oil, American representatives point out that the British have vigorously expanded their operations in Venezuela where their production in 1948 as compared with 1947 showed five times greater expansion than did American operations in that area during the same period (25.8 percent vs. 5.6 percent). These operations have a very high element of dollar cost, (each barrel out of Caracas costs at least $1.60 of hard currency or about 60 percent of the total cost,) and since much of the output must be sold for soft currencies, this constitutes a substantial addition to the net dollar drain, which the taxpayers of the United States are attempting to offset by substantial Marshall Plan contributions.

An analysis of the expected increases between 1947 and 1953 in consumption, British and American production in the eastern hemisphere and in the entire world, shows that British oil companies plan great increases that may result in securing markets now held by American companies. (See Table 4.)

Table 5 shows that British oil supplied 57.7 percent of the requirements of the eastern hemisphere in 1949, while Britain actually controlled 54 percent of the production within the eastern hemisphere itself.

American oil companies that have operated overseas for several decades are disturbed by the possibility that they be required to act as distributors of British oil, buying oil from Shell in Caracas or from Anglo-Iranian at Abadan. This would mean the loss of outlets for American-controlled production and refining. The trading profit that could be found between the British-controlled buying price and the British-controlled selling price might not be attractive, they fear.

The viewpoint of American companies operating in the international field may be summarized about as follows:

It is realized that the United Kingdom and the British sphere of influence cannot afford to continue the purchase of a large portion of their petroleum requirements in dollars and hard currency; but neither can Britain afford to spend scarce and hard currency to duplicate refining and producing facilities that already exist. The needless duplication of even one large modern refinery and its attendant facilities would waste several hundreds of millions of dollars and would be a severe drain on sterling resources and materials. However, American-controlled companies producing and refining in some overseas areas might establish themselves on a footing substantially equal to British companies. They could sell for sterling on world markets if they were allowed to use sterling for the payment of wages, rents, supplies and equipment. The only dollar or hard currency requirements would be for royalties and specialized refinery equipment obtainable only from the United States, and a reasonable profit. Substantial quantities of hard currency are required by British companies themselves for royalties and specialized equipment.

Such a conversion to sterling operations would be quite practicable if American companies undertook to operate as do the British companies, and the British government gave an undertaking that there would be no discrimination against such companies merely because they were American-controlled.

The one item on which American-controlled companies converting to sterling operations would differ from British-controlled companies would be in the remittance of dollar profits. This reflects the fundamental difference between the establishment of these enterprises, as the American properties in the eastern hemisphere were built on dollar investments initiated many years ago and substantially expanded during the critical war period.

This was "risk capital" in every sense of the word, because of the desperate struggles in North Africa, the threat contained in Marshal Rommel's approach to Cairo and the near closing of the Jap-Nazi pincers in the Middle East. In those days of urgent expansion the American companies could procure their refinery equipment only in America and only through the investment of hard dollars. The American defense authorities pushed the American companies to expand their Middle East operations so as to make available needed military supplies for North Africa and the Indian and Pacific Ocean areas.

The fact that the American companies invested a lot of their dollars during that critical stage was the result of world conditions at that time. Now they must convert to a pattern of currency operation in keeping with the world of today.

American companies assert that they are quite willing to adjust to a reasonable basis of operations: reasonable to the British Treasury, reasonable to British oil companies, reasonable to American interests and helpful to the whole economy of the eastern hemisphere. One feature of this would be the payment of corporate taxes at the British 50.5 percent rather than the American 38 percent.

It is not to be anticipated, however, that American companies will discontinue worldwide marketing of petroleum products. By a vigorous adaptation of their production, refining and marketing systems to the competitive situation in each area, American companies will continue to do a competitive share of the world's petroleum business. What is more important, the American companies believe, is that no government take a short-sighted and restrictive view of the enormous energy needs of the world and hence attempt to block the increases in petroleum consumption essential to a rapid expansion of living standards. On the contrary, they think that all governments should recognize that great advantages will accrue from a competitive system in which access to the world's markets is based on economy and efficiency rather than on trade and currency restrictions.

Spokesmen for the American petroleum industry say that the industry should strive for the economic development and expansion of world petroleum along several fronts. While opposing discriminatory trade practices, they believe that it should welcome free competition anywhere in the world, secure in the knowledge that the industry has achieved its greatest progress through such competition. Promoting the restoration of convertibility of currencies and the other attributes of unfettered international trade, the oil industry should explore every possibility for bringing to the still oil-needy people of the world the products they so earnestly require for their advancement in many directions.

Table 5—Eastern Hemisphere

British Share of Consumption and Production
(Barrels per Day)

	1948	1949
Etimated Eastern Hemisphere Consumption	1,608,600	1,850,100
British Production, Eastern Hemisphere	764,200	897,600
British Production, Western Hemisphere	155,000	170,000
	919,200	1,067,600
Percent British Oil to Consumption	57%	57.7%

Production within Eastern Hemisphere

	1948	Percent	1949	Percent
British Production	764,200	56	897,600	54.0
American Production	551,800	42	724,050	43.6
Independent Production	29,800	2	40,550	2.4
Total	1,345,800	100	1,662,200	100.0

ECA'S RELATION TO INTERNATIONAL OIL PROBLEMS

By Joseph B. Huttlinger

Washington

As the lines are forming for renewal of the fight in Congress to limit oil imports into the United States—and indications are that the assault will be more formidable than last year—it is evident that it will involve a number of collateral questions including the petroleum operations of the Economic Cooperation Administration.

When ECA was established, these activities as then contemplated were to proceed along two lines: first, the financing of oil shipments to western Europe to fill acute shortages then existing; second, aid in a program of refinery construction that would enable the countries in that area to import crude oil rather than products, thereby lessening the dollar demand for payment of such imports which they were unable to meet.

At that time when fears of an oil shortage were widespread and imports to the United States were welcomed, the assumption here was that a big expansion of refining facilities would lead western Europe to supply its domestic needs by processing crude drawn mainly from the Middle East. It was realized that this would mean a decided reduction in exports from the United States, a prospect that was viewed with equanimity since it was taken for granted that all available United States supplies would be needed for domestic use.

As the situation has worked out, however, the need for dollar saving still is urgent among the sterling nations, and the supply of oil itself has greatly increased. The British government has found that oil is extremely useful as a trading commodity and, through commercial arrangements with various countries and regulations applying to its own territories, has replaced in numerous markets the products of American companies operating internationally with that of British-controlled corporations.

The possible effects of this trend were brought forcibly to the attention of the American public in December last when the British Ministry of Fuel and Power announced that "as a result of increased production and the maintenance of restrictions on consumption, British oil companies expect to have available in 1950 some surplus oil over and above what they will need to supply their established markets." The government felt, the statement continued, that oil importers should be required to absorb this surplus before drawing supplies from dollar sources. Accordingly the government proposed to prohibit imports of fuel oil from dollar areas and to reduce imports of motor fuel by one-third.

This announcement caused further concern among the opponents of United States imports who feared that dollar oil displaced from other markets would flow in increasing quantities to this country. It was received with surprise coupled with some indignation among some members of Congress and led to a suggestion to administrators of the Marshall Plan that no further appropriation for British refinery construction be made until the international tangle was straightened out.

As a matter of fact, the appropriations by ECA for refinery construction in Europe have little bearing upon the problems of possible dislocation of international oil trade which are causing concern in oil industry circles. During the past year, since the refinery expansion program got under way, the aid approved by ECA applies to nine refineries, of which five are located in France and two each in the United Kingdom and Italy. The increase in capacity of these refineries as shown by the accompanying table is 114,300 barrels daily. The total amount of ECA aid is roundly $24,000,000. By way of comparison the estimated cost of refinery improvements and new construction under way or projected in ERP countries is upward of $160,000,000, and the resultant capacity will be upward of one million barrels as compared with 380,000 in 1948. ECA, however, has consistently opposed the expansion of European refining capacity beyond the needs of the countries in which the plants are located.

The main questions relating to oil as to which discussions have been under way between repre-

(Please turn to Page 64)

European Refinery Projects Approved for ECA Financing

Country and Location	Company and Affiliation	Expansion in Capacity (Barrels per day)	ECA [a] Dollars	Other Amounts	Total Dollars and Dollar Equivalent [b]
France Donges, near St. Nazaire	Raffineries Francaises de Petrole de L'Atlantique (French company)	8,000	750,000	8,685,000	9,435,000
Gonfreville (Seine) and LaMede (near Marseilles)	Compagnie Francaise de Raffinage (French company)	0[c]	3,150,000	7,850,000	11,000,000
Berre (near Marseilles)	Compagnie de Raffinage Shell-Berre (Royal-Dutch-Shell and French ownership)	26,600	1,850,000	29,800,000	31,650,000
Gravenchon (Seine)	Socony-Vacuum Francaise (Socony-Vacuum Oil Co.)	0[c]	850,000	5,150,000	6,000,000
Port Jerome (Seine)	Standard Francaise des Petroles (Standard Oil Co. (N. J.), majority owner; also Gulf Oil Co., Atlantic Refining Co., and French ownership)	0[c]	1,427,500	4,987,500	6,415,000
Italy and Trieste Trieste	Aquila S.p.a. Tecnico Industriale (Italian company)	0[c]	4,250,000	3,700,000	7,950,000
Port Marghera (near Venice)	Societa Industria Raffinazioni Olii Minerali (Azienda Generale Italiana Petroli, and Anglo-Iranian Oil Co.)	11,600	1,800,000	4,600,000	6,400,000
United Kingdom Shell Haven (near London)	Shell Refining and Marketing Co. (Royal-Dutch Shell)	32,000	2,455,000	31,545,000	34,000,000
Llandarcy (Wales)	National Oil Refineries, Ltd. (Anglo-Iranian Oil Co.)	36,100	7,250,000	40,750,000	48,000,000
TOTAL		114,300	23,782,500	137,067,500	160,850,000

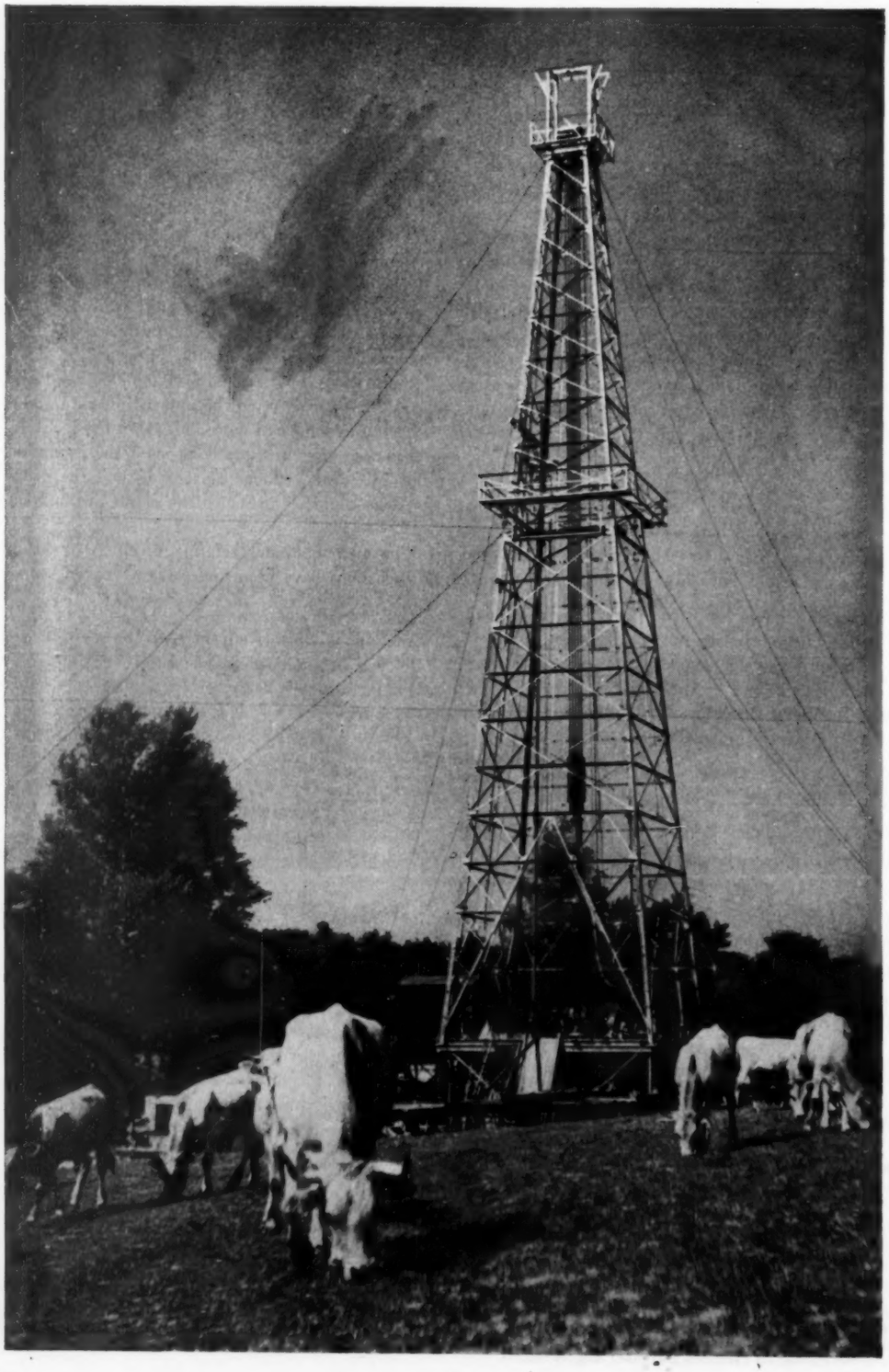
[a] Amounts authorized to meet dollar exchange requirement for purchase of equipment and engineering services in the United States; in each case the company concerned pays the full amount, in local currency, to the local government.
[b] Calculations for conversion of foreign currencies were made prior to major currency devaluations of September 1949.
[c] Where no increase in capacity is shown, project involves lubricating oil facilities and other improvements.

SEARCH FOR PETROLEUM IN FRANCE

France and Its Overseas Territories

By Henry M. Ballande

St. Medard No. 1 well of Soc. Nationale des Petroles d'Aquitaine.



EXPLOITATION of hydrocarbon resources in the French sub-soil is not as recent as is generally thought. At the time when the Mayflower landed in New England, oil exploitation by mining was already going on near Nîmes. Twenty years before the War of Independence the Pechelbronn mine was producing lubricants on an appreciable industrial scale. At the time of the Civil War, the asphalt of Bastennes (near Pau) was covering the surface of the most beautiful avenues of Bordeaux, London and Paris.

Unfortunately these surface indications were not really the sign of rich and easily exploitable deposits. At that time it was readily seen that the evaluation of the eventual sub-soil petroleum resources of France would not be profitable, and so the idea was passed up. However, between the two world wars, the increase of petroleum consumption necessitated large and rapidly increasing importations. Their unfavorable effect on the commercial balance and also with regard to strategic considerations, kept the subject on the table. Progress in methods of prospecting and in drilling allowed the hope of eventually reaching sound economic results, despite the difficult nature of the probable oil-bearing terrain.

Nevertheless, the financial risk of the enterprise appeared to be very great. For this reason the government decided, in order to encourage private industry, to assume part of the burden and to participate in the establishment of prospecting companies.

This assumption of interest has led the government to play a very important role in the direction and coordination required for the development and activity of these companies. The government exercises this function through the Bureau de Recherches de Pétrole (B.R.P.), a public organization with a legal status and a financial autonomy; the role of this bureau consists of the following:

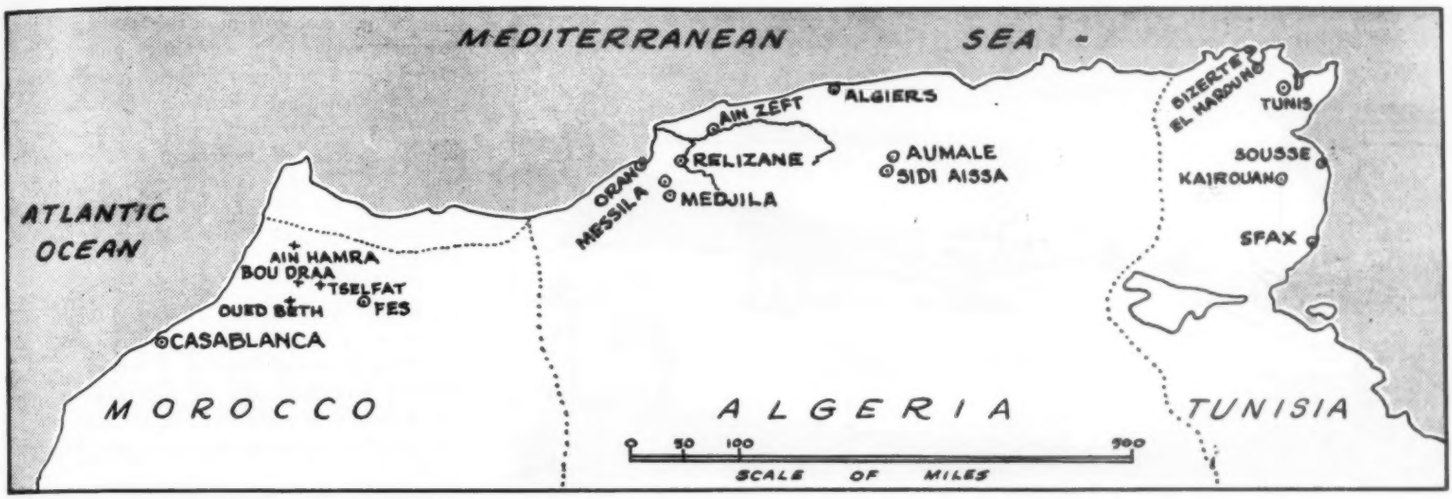
(1) To establish, in conjunction with the prospecting companies, a long-term program;

(2) To distribute public funds among the various companies;

(3) To coordinate the action of these companies and to control the use of the funds.

As regards these companies, the B.R.P. is thus a financial trustee and has the right of economic and technical control, justified by its financial participation. The law prohibits it from drilling on its own account.

The object of this policy has been fully attained and a number of important companies having a



Location of drilling operations—Northern Africa.

mixed economy—that is to say, constituted with government funds and private capital—have been created or developed since 1936, for exploiting the petroleum resources of France proper and the overseas territory of the French Union. Their activities are evidenced by the fact that they have drilled 450,000 feet in 1948. Below we show the principal results obtained to date:

In Alsace since 1920 the Société Pechelbronn has exploited the old deposit of oil sands situated to the north of Strasbourg. Its average production, from about 1,500 barrels daily in 1938, was reduced by war damage, and up to quite recent times has not passed 1,000 barrels daily, about half of which is produced from shallow wells drilled with percussion tools, the rest being recovered by seepage along inclined stopes, similar to mine stopes.

Last July a somewhat deeper well near Soultz-sous-Forêt explored the Muschkalk limestone lying under the layer of sand and encountered a violent rush of oil at 2,500 feet depth corresponding to a production of 7,300 barrels daily. After completion the well was put in production at the end of August with a regular yield of 440 barrels daily, and exploration in the Muschkalk limestone was stepped up to define the production possibilities of this layer and to bring it under exploitation. The non-sulfurous crude contains 12 to 14 percent paraffin and is particularly suitable for the manufacture of quality lubricants.

The fact that the company has only a single rotary apparatus, and this not a powerful one, it being the one which drilled the discovery well, emphasizes the acute need of prospecting tools and modern materials and the need of supplying the company with suitable equipment.

Three companies are participating in the work in southern France: R.A.P., Aquitaine and Languedoc.

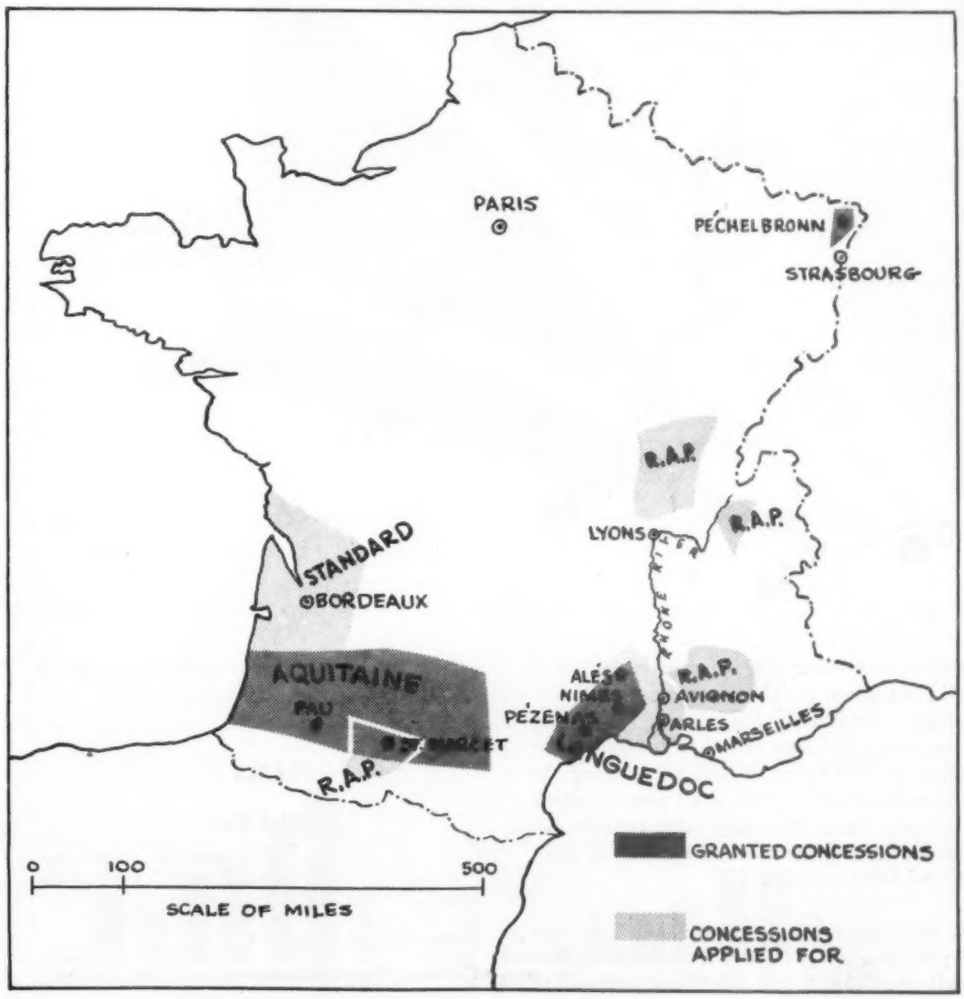
The R.A.P. (Régie Autonome des Pétroles) belongs wholly to the government, which founded it for the initial exploitation of the rich gas deposits of Saint-Marcet, which was discovered on July 14, 1939. Among about 40 wells, the depths of which vary from 2,000 to 13,000 feet, generally 6,000 to 8,000 feet, 12 have reached the high-pressure gas layers and two penetrated oil-producing beds.

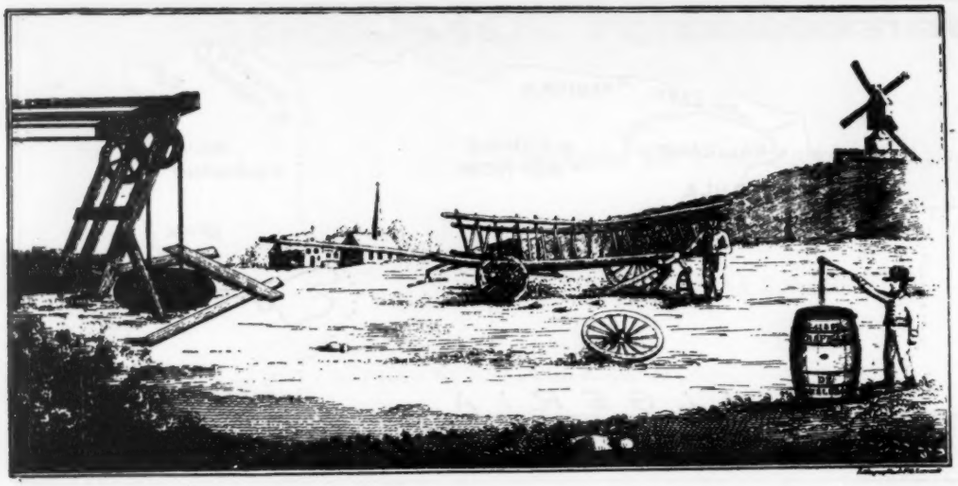
Most of the gas wells now in production have a considerable production capacity. A number of them came in with an absolute potential (open flow capacity) above 35,000,000 cubic feet per day and a practical potential of 18,000,000 cubic feet per day. They have thus given a total of 6,000,000,000 cubic feet in 1948 and this is expected to reach 10,000,000,000 in 1949 and more than 13,000,000,000 in 1952.

The composition of the gas is shown in Table I.

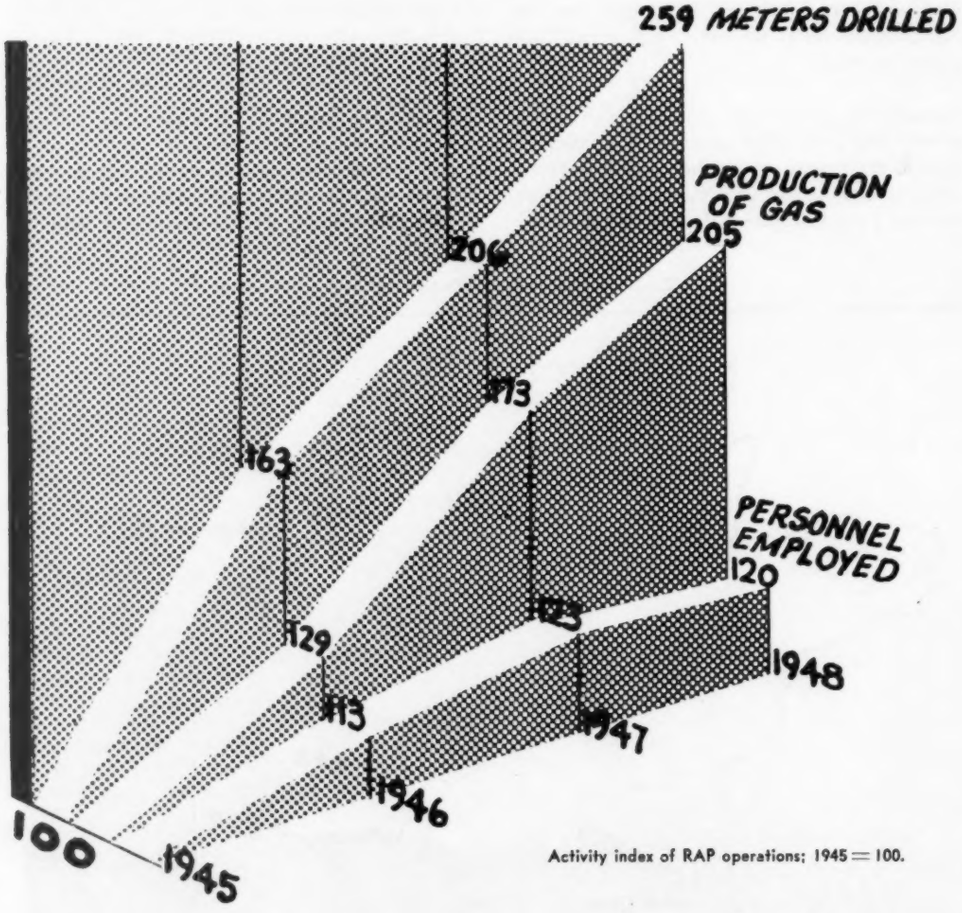
The company has arranged for distributing the gas to the principal industrial centers and to the cities of southwest France through a 500-mile

Concessions granted or applied for in France.





Pechelbronn, 1772; drawing shows well and two main uses of products, for lubricating carts and windmills.



Activity index of RAP operations; 1945 = 100.

network of pipelines which can carry 10 billion cubic feet per year. The natural gas factory at Boussens, installed in 1942 by the Compagnie Française de Raffinage, was supplemented in the spring of 1949 by an R.A.P. plant, using the Hudson Engineering Company's process, which allows of treating 40 million cubic feet per day with recovery of about 250,000 barrels of gasoline and LPG. per year.

On the other hand the production of the two oil producers is very small, but the crude oil is of excellent quality. It is non-sulfurous, contains 22 percent gasoline, six percent kerosene, 11 percent gas oil and 48 percent lubricating oil.

TABLE I

Wet Gas

	Percent by Volume	Grams per Cubic Meter
Methane	89.0	
Ethane	4.5	
Propane	1.6	32.2
Butane	0.9	23.6
Pentane & Higher Homologues	1.1	61.0
Nitrogen	2.9	

The prudent management of the Société and the fortunate results of its exploration program has placed it in a privileged financial position compared with analogous enterprises which are operating in French territory. Up to date it has been able to amortize 45 percent of its investment, which is all the more favorable because exploitation to date has affected only a small part of the estimated reserves of the Saint-Marcet formation alone.

La Société Nationale des Pétroles d'Aquitaine, 38 percent of the capital stock of which has been subscribed by private interests, is exploring a 6,900,000 acre concession in Aquitaine, within which there is an enclave of 612,000 acres where the R.A.P. is exploiting the gas of Saint-Marcet.

Founded in 1941, the Société was not able to work until after the liberation, and since 1948 it has been concentrating its efforts to the north of Pau. A serious geological and geophysical study of the southern part of the Aquitainian sedimentary basin has been made with the help of the drill and has given encouraging signs. One well has produced up to 700 to 800 barrels of crude. Another, the deepest in Europe, 13,870 feet, was stopped by an accident at the moment when traces of gas and oil stains appeared in the mud.

However, notwithstanding the fact that eight drilling rigs, six of them large ones, have been put to work, up to the present time no exploitable production has rewarded the efforts of the Société.

On this subject it is interesting to quote Dr. G. M. Lees, chief of geological research of the Anglo-Iranian Company, who, after a detailed visit in Aquitaine, has expressed the opinion that, "It is difficult to conceive that a zone so rich in signs of oil and which has such a large number of structures of various types, could be without any important accumulation of petroleum."

Further to the east between the Pyrenees and the Mediterranean Sea the Société Nationale des Pétroles du Languedoc Méditerranéen, 34 percent of the stock of which belongs to individuals or private companies, has a permit to explore a territory of 1,900,000 acres. The activity of this company, which began in 1945, now extends over four zones:

(1) Region of Pézenas, in the Jurassic, where an effort is being made to reach in depth structures analogous to those which have given a small production at Gabian from 1930 to 1940 (the Castelnau, the Guers and the Coulobres wells).

(2) Region of Lavaunage (west of Nîmes) where the results have not up to the present fulfilled hopes; the porosity expected in the rocks was not found, the signs of high-pressure gas (more than 6,000 pounds per square inch) which were met in the last months of 1948, have not, up to the present, resulted in production. The work is being pursued.

(3) Region of Camargue: The results of a geophysical campaign have warranted the beginning

of a drilling program in the Tertiary region of Arles.

(4) Region of Alès: Quite recent discoveries dating from the middle of last July, have put in evidence at St-Jean-de-Maruéjols, near Alès, at an average depth of 2,400 feet, an exploitable formation which has already begun to produce in moderate quantity a very dense sulfurous crude, from which there is obtained a little gas-oil, some lubricating oils and a very large proportion of bitumen.

To terminate this brief review of prospecting in France proper, we will note the applications for new permits now in the course of examination:

R.A.P.—350,000 acres to the south of the present concession.
1,715,000 acres near Avignon
312,500 acres in Savoie
1,850,000 acres to the north of Lyon.

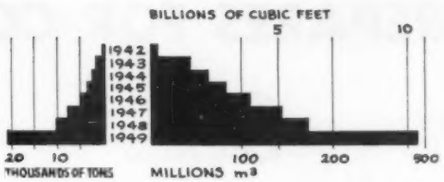
Languedoc—902,500 acres to the east of the existing concession, covering the low valley of the Rhone.

Standard Française des Pétroles—3,850,000 acres around Bordeaux.

Pechelbronn—2 permits located in middle and lower Alsace, one of 150,000 acres to the north of Strasbourg and the other of 100,000 acres in the region of Sélestat.

Prospecting for petroleum has been frequently undertaken in Algeria since 1890. Despite the timidity with which the financial efforts in this direction have been made, they have occasionally obtained encouraging indications and have resulted in the location of three small producing formations: Ain Zeft, at 1,000 feet at the top of the Miocene, has given 20,000 barrels of a very heavy crude. At Messila and Medjila sands situated at the base of the Upper Miocene, have produced, at 300 to 500 feet, 200,000 barrels of a light oil containing up to 40 percent and even 50 percent gasoline.

But it is only since 1942 that systematic geological surveys have been undertaken; these have resulted in locating some 20 structures, five of which have been the object of intensive prospecting by gravimetric and seismic examination. Founded in 1946 for the pursuit of these studies and for exploiting their results, the Société Nationale de Recherches et d'Exploitation des Pétroles en Algérie (S.N. REPAL) has a capital of 1,600 million francs which was contributed in equal parts by the B.R.P. and the general government of Algeria.



Annual production of gas and liquid products by RAP.

The Société at first concentrated its efforts on geophysical and geological prospecting while awaiting the receipt of modern drilling equipment which is on order in the United States; it is extending its prospecting toward the east and is approaching the Sahara.

Two zones are receiving particular attention: the valley of Chéliff and Sidi Aissa near Aumale on the north flank of the high plateaus, where two productive formations have been discovered during the first months of 1949. The upper bed of Sidi Aissa (600 to 1,000 feet) is at the present time delivering about 100 barrels per day of a crude oil containing a very high percentage of gasoline which has an excellent octane number. Another bed has been located at about 2,000 feet and the drilling of a series of small producing wells is in progress.

Up to this particular point this work has been carried out by the Sociéte des Pétroles d'Aumale, which has a capital of 60 million francs, of which half belongs to the S.N. REPAL and the other half to the Sociéte des Raffineries de Pétrole d'Algérie, a private company which has bought the equipment for a small topping plant of 280 barrels daily where the production of Sidi Aissa will be processed.

From 1932 to 1938 prospecting for oil in Tunisia with important financial means and modern material has been carried on by a Syndicat d'Etudes constituted by the governments of France and Tunisia, the Compagnie Française des Pétroles and the Société Pechelbronn. A series of wildcat holes near Bizerte has disclosed, at a depth of about 2,500 feet, at first traces and then blows of gas containing 74 percent methane. Another blow of wet gas was encountered in 1940 on another structure in the same region.

After an interruption of five years due to the war, the work was resumed in 1947 on an important scale, with trained crews of technicians and with modern materiel which was mostly imported from the United States. At 6,000 feet the first well at El Haroun, in the Paleocene, penetrated a zone containing gas and a little lower down there was a gas eruption. On the Cap Bon peninsula one well, drilled into the structure of Sidi Abder Rhamane, evoked an eruption of gas at 4,400 feet in the Albo-aptien, and water was encountered at 7,200 feet in the Jurassic, and below were signs of oil. Quite recently, October 1949, a new eruption of gas occurred in the same region when a well reached a depth of about 4,800 feet in a bed of bituminous sand.

At the same time from 1945 to 1949 geological and geophysical prospecting has been extended to central and southern Tunisia, where the indications are less numerous than in the north, and where the tectonics of the sedimentary beds and the form of the structures are more extensive and regular, there has been found hope of discovering important accumulations, especially in the regions of Kairouan, Sousse and Sfax. Two wildcats drilled from 2,200 and 3,200 feet in the Zaouia (central Tunisia) have shown the existence of Lower Cretaceous sand impregnated with light oil.

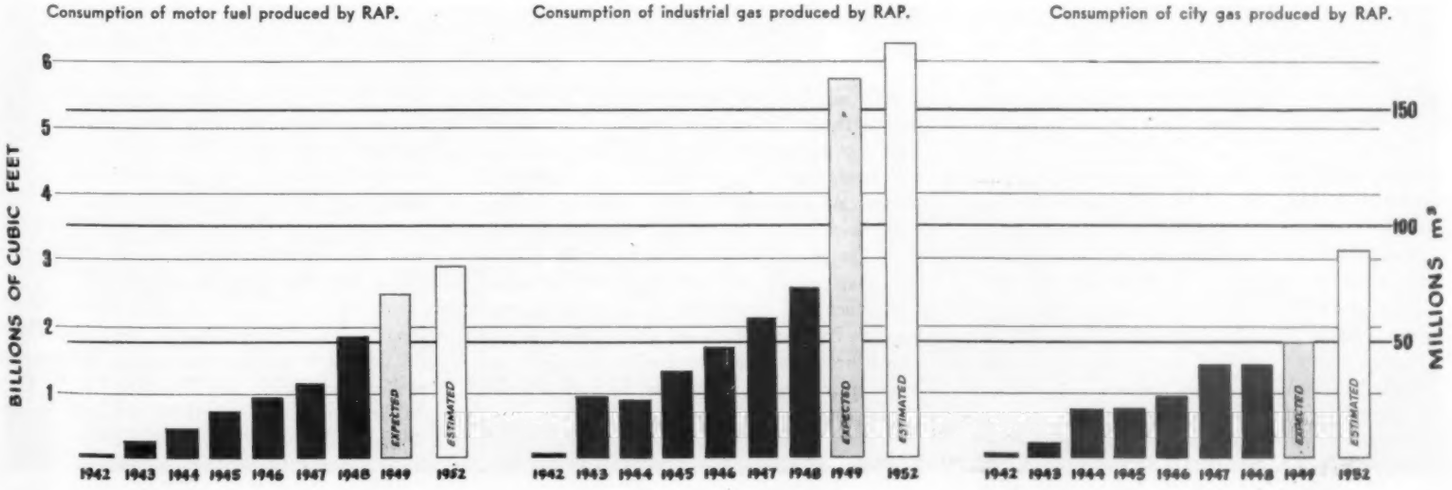
The possibility of production from the Tunisian sub-soil will become definitely known within a relatively short time. Thus, three companies are ready to participate in the prospecting and later on in the exploitation: the Société de Recherches et d'Exploitation des Pétroles en Tunisie

(Please turn to Page 54)

Consumption of motor fuel produced by RAP.

Consumption of industrial gas produced by RAP.

Consumption of city gas produced by RAP.



DETROIT PREPARES FOR COMPETITION

By Eric Eltham

Greater Emphasis on Automatic Transmissions and Lower Prices Woo 1950 Car Buyers. New Transmissions to Offer Large New Market for Hydraulic Fluids to Petroleum Industry.

AS THE Detroit auto-makers lifted the curtain on their 1950 models, the public saw a number of indications that postwar competition is becoming keener. A downward trend in the price tags, in spite of the hike in steel, and changes in the cars themselves suggest that the battle for business is on. Buick announced price reductions ranging from $65 to $310. Oldsmobile came out with price cuts ranging up to $235 the day before steel increased. Competition in the lower price ranges appears imminent with Henry Kaiser's announcement that his plant at Willow Run will soon go into production with a car selling in the neighborhood of $1,000. There are reports that another manufacturer is coming out with a car using a light Italian engine that will be in this price range. Nash is showing a handmade, low-price model to test public reaction.

The trend of postwar design that first became apparent in 1948 has been continued and extended. The low silhouette, wider vision, larger interior dimensions, integrating of the fenders with the body, and improved ventilating and air conditioning are features that are apparent in the models of all makers. This emphasis on increased comfort and clean design, as opposed to what Raymond Loewy calls the Schmaltz and Spinach design, was very much in evidence at the January meeting of the Society of Automotive Engineers in Detroit where several papers were given on these subjects. Mr. Loewy, it will be recalled, is responsible for the postwar Studebakers that first appeared in 1946 and which have been the outstanding example of bold, new design. Speaking at the Detroit meeting of the SAE, Mr. Loewy said:

"My staff designers are thoroughly indoctrinated in some fixed principles. The emphasis is always on the same points: (1) that weight must be kept to a minimum, (2) that visibility must be excellent, and (3) that the automobile must look fast and that, even stationary, the car must have been built in forward motion."

How these points are put into practice can be seen by looking at the 1950 Studebaker Champion. From the windshield back, the lines of the new Studebakers resemble previous models, and the generous use of glass has been retained. The front of the car has been completely redesigned to emphasize the appearance of motion. This is done by using an airplane fuselage-type hood flanked by air-foil front fenders. A chrome "spinner" at the front at first appears to be a concession to the lovers of gingerbread, but on closer inspection it will be found that this device is purely functional, since it augments four frontal openings that direct air to the engine for maximum cooling.

Hiram Pacific, project engineer for the Ford Motor Co., participated in a panel discussion of functional body design at the SAE meeting. He talked at some length on "comfort engineering," stressing the importance of being able to drive a car for long periods of time without becoming fatigued. It is encouraging to note his concern over the matter of scientifically designed seats to prevent poor blood circulation, increase of blood pressure, poor breathing and cramping of abdominal organs. He also emphasized the importance of reducing noise. In this respect it is only fair to point out that probably more attention than ever before has been given to sound insulation in the 1950 cars. For example, in certain models of the new Dodge, thick sheets of rubber-backed jute are used on the dash and on the forward side panels in the driver's compartment.

The trend that first became evident in 1949 of having the radiator grille consist of horizontal lines is still prevalent, though Buick and DeSoto still retain the familiar vertical, or "waterfall" design. All manufacturers are stressing the ease with which repairs can be made to the body. DeSoto, Dodge and Buick, for example, have grille bars that can be removed singly for individual replacement, if necessary. In many cases, rear bumpers have been deepened and widened to give added protection to the fenders; fenders are bolted rather than welded to the body so that repair costs are minimized.

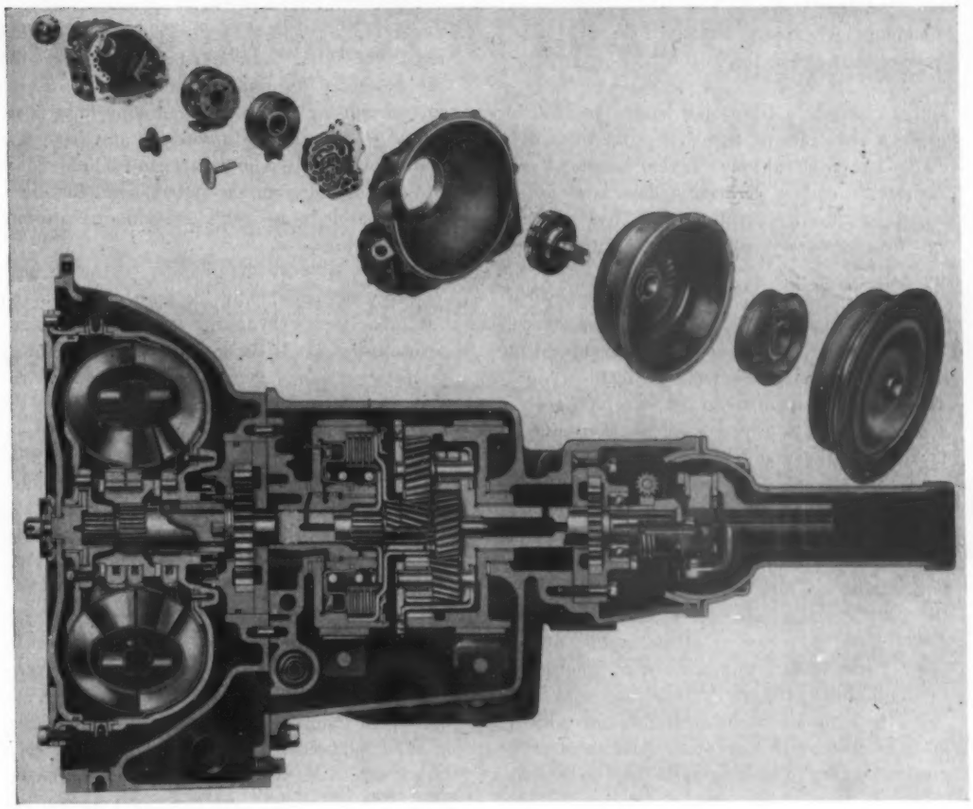
In 1949 we saw the introduction of higher compression engines in the Oldsmobile and Cadillac. The Oldsmobile engine is a version of the famous Kettering high compression engine that General Motors has been working on for many years. Experts agree that the block design used in the Oldsmobile will be unchanged for at least a decade, though it is expected the compression ratio, now 7.25 to one, will be gradually increased to 11 or 12 to one as the required fuels become available. Other manufacturers have not made such radical engine changes as Cadillac and Oldsmobile, but the tendency is for a gradual increase in compression ratio, with the average probably now being in the neighborhood of seven to one. In some cases there are two ratios available. For example, the 1950 Studebaker, both Champion and Commander models, can be had with compression ratios of seven to one or 7.5 to one, while Buick in its Special series offers 6.3 to one when Synchro-mesh transmission is used, or 6.9 to one if Dynaflow Drive is installed.

In a very interesting paper read before the January SAE meeting, entitled, "150 Miles per Gallon Is Possible," R. J. Greenshields of the Shell Oil Co. showed that increasing the compression ratio of a stock car from 6.5 to one to 10 to one can give a ten percent increase in mileage. This is one of the practical steps taken to make this phenomenal mileage, actually achieved in carefully supervised road tests, possible. The other measures used, like inflating tires to 110 psi and disconnecting all engine accessories, are not practicable for the commercial or pleasure vehicle. The annual mileage marathon run by Greenshields and his associates does turn up many interesting factors influencing the consumption of fuel. Compression ratio is certainly not the least of these, and it is encouraging to see that the auto-makers are taking notice of this fact.

While the gradual increase in compression ratio is taking place, there is a concurrent development that should not be underestimated. This is the increasing use of the automatic transmission that probably will, within five years, have completely superseded the mechanical, hand-operated gear shift that has been standard for so long. The automatic transmission should not be confused with the hydraulic transmission or fluid flywheel which has been in use for some time.

Since the war General Motors has added Hydra-Matic and Dynaflow transmissions on the Oldsmobile and Buick, and Chrysler has its Gyro-Matic transmission. In 1950 Packard is introducing its Ultramatic drive, and Studebaker will bring out the Studebaker automatic transmission

An exploded view of the Chevrolet transmission showing the principal operating parts. From right to left: turbine in its housing, stators, primary pump, front oil pump, bell housing, valve body, hydraulic clutch with low band, planetary gearset with reverse band, transfer case with parking pawl and detent lever (the manual control connection) and rear oil pump.

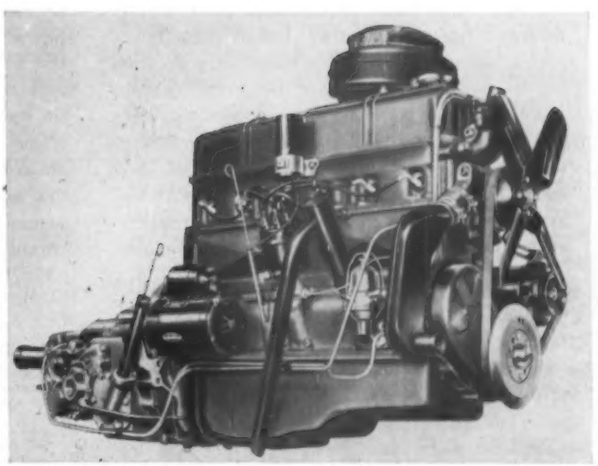


developed jointly by Studebaker and the Borg-Warner Corp. And on January 6 Chevrolet announced its Powerglide automatic transmission as optional in its deluxe models.

These transmissions fall into a group known as hydrokinetic torque converters. They are made up of the following elements: a fluid coupling having one member connected to the engine drive shaft and a turbine member that is driven. Between the impeller and turbine there is usually a reaction member or stator which makes torque multiplication possible. Power is transmitted through this coupling by a hydraulic fluid which flows at high speeds. This coupling takes the place of the conventional clutch. Coupled to the torque converter there is usually a mechanical transmission which automatically changes according to the power requirements. The Buick Dynaflow unit, however, has no gears, yet gives an infinite number of gear ratios.

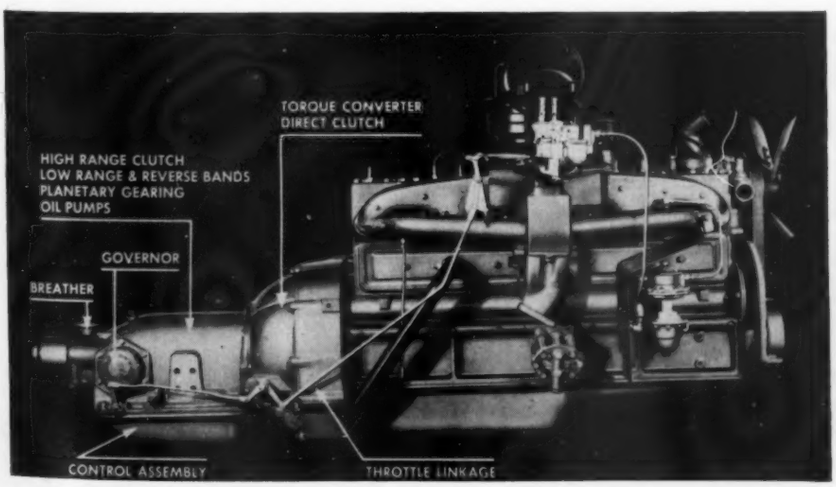
The new Chevrolet transmission is described in a paper delivered before the Society of Automotive Engineers by R. S. Plexico and R. E. Kaufman. It consists of a General Motors polyphase five-unit torque converter supplemented by a planetary gearset hydraulically actuated by a multiple disc clutch and two bands to give a driving range, low and reverse. The converter incorporates an auxiliary fluid coupling that is designed to give an effective drive for starting the engine and also improves over-run braking when the car coasts against the engine. Realizing that automatic transmissions work best with an engine designed to take advantage of their characteristics (i. e., high horsepower to weight ratio), Chevrolet offers its Powerglide automatic transmission with a new, high compression, 105 horsepower engine having 235 cubic inches displacement. This engine, for the first time in the low price field, offers the refinement of hydraulic valve lifters. The torque converter itself is manufactured from precision cold formed parts or

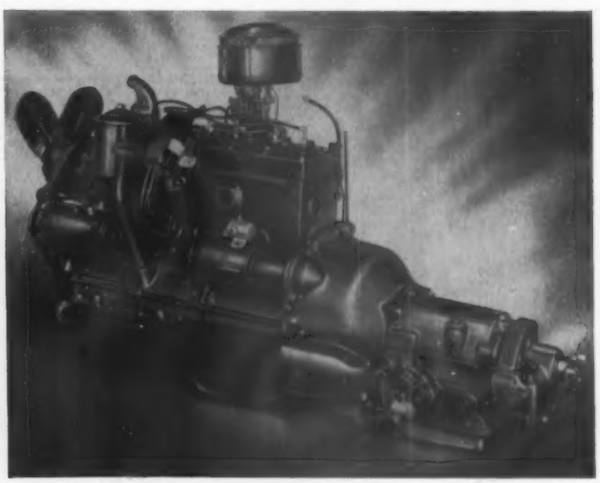
Left-hand three-quarter view of part of the 1950 Chevrolet 105-hp motor and Powerglide transmission assembled as a unit. Note the two pipes leading from the transmission to the heat exchanger, mounted forward. The transmission filler spout is adjacent to the starting motor.



Studebaker's automatic transmisson is adaptable to the standard 102-hp power plant used in all 1950 Commanders and Land Cruisers. The curved duct directs outside air into the transmission's independent cooling system.

Packard engine with Ultramatic drive housing.





stampings which are assembled in the largest brazing furnaces in the world.

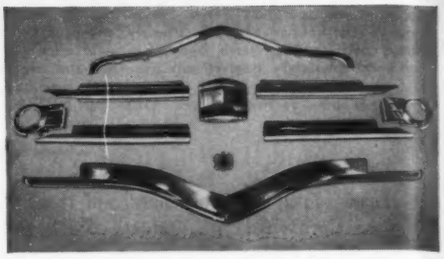
Other changes in Chevrolet design for 1950 include a reduction in rear axle ratio from 4:11 to 3:55 in order to lower engine speeds. A new carburetor with a concentric float bowl is designed to prevent starvation of the fuel metering jet in sudden starts and to guard against vapor lock.

The advantages of the automatic transmission are many. In the first place, the demands on the driver are greatly lessened, for there are only two operations required to get into high gear as compared with fourteen with the conventional gear shift. Wear and tear are also reduced because the transmission of power is not accompanied by the shocks inherent in the mechanical system. The major disadvantage of the hydraulic transmission, and admittedly this is very slight, is a sacrifice in fuel economy as compared with the conventional transmission equipped with overdrive. This is because of a combination of factors. There is a certain amount of slippage in the fluid clutch, though in some cases this is reduced to a minimum by providing for positive mechanical drive in high gear. Also there are a greater number of moving parts than in the conventional transmission, and consequently efficiency is reduced. Then, fluid transmission often requires an engine speed that is not the most favorable from the point of view of economy.

Specifications for hydraulic fluids vary according to the manufacturers of the units, though much testing is being done in cooperation with the manufacturers and the petroleum industry to standardize, insofar as possible, the requirements. Obviously the fluid should be as stable as possible, and since it is subjected to temperatures varying from —40° F to 300° F, oxidation inhibitors and carefully selected crudes are important. Care must also be taken to see that the fluids are resistant to foaming. In addition to transmitting power, the hydraulic fluid is required to protect the transmission unit from rust and corrosion. It is impossible to exclude moisture completely from the system, and, therefore, it is advisable to use a fluid containing a rust and corrosion inhibitor.

Viscosity is undoubtedly the most critical of all the properties of hydraulic fluids for automatic transmission. It is the viscosity in the operating temperature range that is critical, and it is for this reason that engineers are proposing that the specification be chosen at 210° F. Broadly speaking, a viscosity in the range of 30 to 50 SSU at this temperature is adequate. Viscosity index is not so critical, and oils in the range of 50 to 100 VI seem to operate best in the present designs. The exception to this is the Dynaflow unit, in which an oil of high VI is desirable.

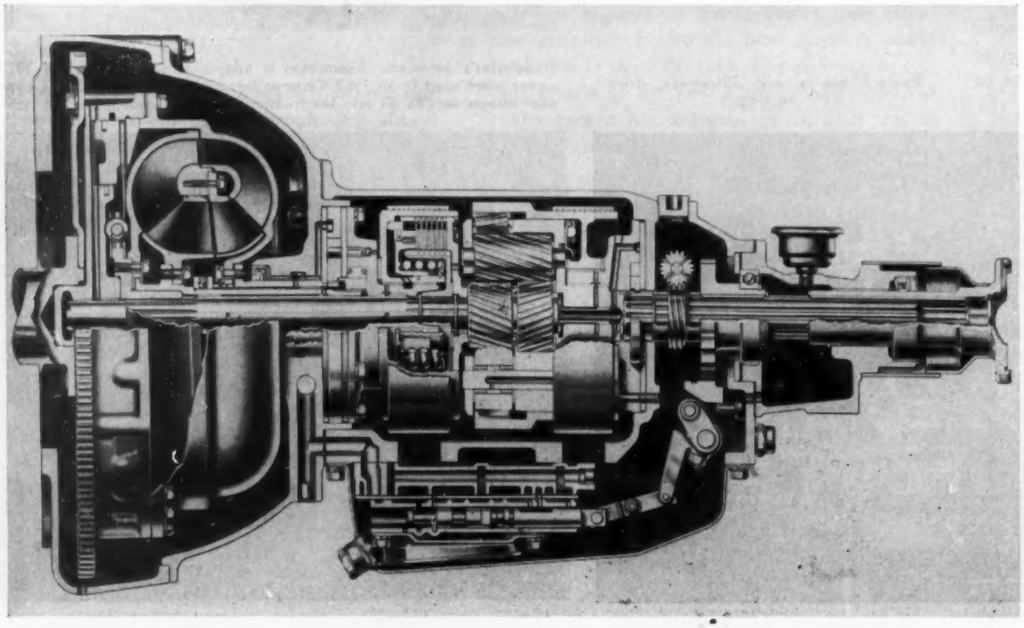
In addition to the somewhat lower gasoline mileage record of cars equipped with torque converters, these units have a further importance to the petroleum industry because of the large volume of fluid required for initial filling and the even larger quantities which will be required for refills. The Chevrolet converter, for example, has a liquid capacity of eight quarts. Walter Hochuli of The Texas Co. recently estimated that factory fills will consume 1,800,000 gallons per year and that in 1950 refills and servicing will require five million gallons. He believes that within five years the servicing requirements will rise to 25 million gallons and that the annual requirements will be up to 60 million gallons by 1960. Importance of this prospective market to the industry may be suggested by the current retail selling price of transmission fluids which are on the order of 65 cents per quart. The price is higher than most lubricating oils because of the additive requirements to create the special qualities demanded by the service.



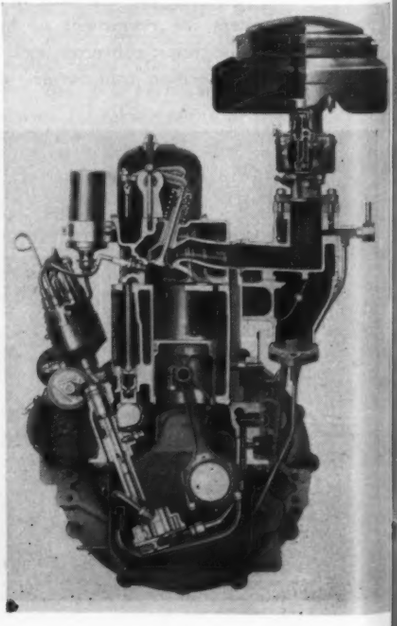
The grille on the new Dodge cars is made of nine separate pieces, separately replaceable to minimize the cost of repairing front end damage. Several car manufacturers are featuring bolted fenders for low-cost replacement or repair.

Other refinements to appear in 1950's cars include the application of chemical treatment to insure safe and rapid break-in of ring and cylinder surfaces. Dodge, for example, is introducing this feature under the name "speed-proofing." Several manufacturers are designing the ignition system to give the least interference to television and radio receivers. Pontiac accomplishes this by using carbon-impregnated fibre high-tension leads. All in all, there is no doubt that the automobile industry, which in 1949 topped all production records by turning out six million vehicles, is concentrating not only on production but on quality, and at the same time is making a determined effort to lower the cost of its product. At the mid-century, the industry can be proud of its progress during its first fifty years, and it can look forward with health and vigor, confident that it is capable of meeting the needs of the next fifty years.

The Packard Ultramatic drive combines a torque converter with positive mechanical drive for cruising. Unit shifts automatically into direct drive at 55 mph or may be shifted by a momentary release of accelerator pressure at speeds as low as 15 mph. Planetary gears provide low, high and reverse driving ranges.



A sectional view of Chevrolet's new 105-hp motor and the new carburetor showing the installation of the hydraulic valve lifter assembly between cam shaft and push rod.



OIL INDUSTRY PROGRESS IN BRAZIL

By R. G. Walker

New oil law regulating foreign operations to be debated. NPC continues search for new fields. Refinery construction to be active.

Rio de Janeiro

DURING 1949 the National Petroleum Council of Brazil followed a program previously outlined in collaboration with the consulting engineers, DeGolyer & MacNaughton, whose contract has been extended to 1951. The work included geophysical prospecting in the Marajó basin, with the application of gravimetric, seismic and magnetometric methods, and geological and seismographic investigations in the sedimentary basin of the lower and middle Amazon. The operations of the geophysical service show that Marajó Island basin, embracing an area of 23,000 square miles, contains sediments of variable thickness ranging from 3,000 to 11,000 feet. It begins 120 miles south of Belem, Para, and continues for 300 miles to the north through the islands of Marajó, Caviana and Mexiana to the Atlantic. During 1949 a sedimentary layer was marked out in the center of Marajó, extending for 120 by 72 miles with an average thickness of 11,000 feet. At the end of the year operations were suspended on the island, and the gear was moved to near the junction of the Para and Tocantins Rivers on the mainland, where drilling is scheduled to start in March 1950. New rig capable of drilling to 15,000 feet has arrived from the United States for use at this position.

Geophysical prospecting by the seismic method also was started during the past year and geological studies continued in the central area of the sedimentary basin embraced by the states of Maranham, Piaui and Goias. Earlier investigations, in collaboration with Donald F. Campbell and Walter Schenk, had indicated that the best technical conditions favorable to the accumulation of oil existed between the cities of Balsas and Carolina in Maranham. As a result of the detailed studies and stratographic tests made in this area, drilling will start early in the year near Carolina, using a rig equipped for a penetration of 7,500 feet. This town is on the right bank of the Tocantins River which divides Maranham and Goias. As there are no roads or railways in the neighborhood and navigation over the river is interrupted to the north by falls, gear and labor will have to be conveyed by the Parnahyba River through Teresina, capital of Piaui, to Urucui. A road will be built from the latter point to Carolina, a distance of 200 miles.

Geological investigations were continued during the year in Sergipe, Alagoas and Pernambuco to determine the points at which experimental drillings should be made. Locations selected are in the northeast corner of Bahia in the sedimentary area which extends to the San Francisco River, and in Parana in southern Brazil. The most promising areas in northeastern Brazil appear to lie between Penedo, Alagoas and the Atlantic, and in the neighborhood of Geremoabo, Bahia.

By the end of 1949 the Petroleum Council's activities had embraced 14 states, as compared with two in 1945. Drilling operations continued in the Reconcavo district of Bahia where five oil fields have now been opened. Of these the Dom Joao field, discovered in 1947, is still in an initial stage of development and the limits have not yet been determined, but it is expected to prove the most valuable find made to date. The oil is lighter than that of Candeias and exists nearer the surface, the average of recently drilled wells being 1,154 feet as compared with 3,364 at Candeias. There are seven producing zones at D. Joao, the most important wells being 800 and 900 feet deep.

The following was the position at these Bahia fields at the beginning of 1949: Candeias, 75 wells drilled; Itaparica, 27; Lobato-Joanes, where flowing oil was first discovered in 1939, 17; Aratú, 13; Pitanga, no longer considered promising, four; Dom João, 11; total 147. Full details are not yet available for 1949, but at the end of October 17 new wells had been drilled, bringing the total up to 164, of which 88 are yielding oil and 14 gas, 62 being dry. The reserves are now estimated at 24 million barrels, corresponding to 839.5 million imperial gallons of crude oil. Production of oil is at present limited to the requirements of the Petroleum Council's own services, but the gas, of which approximately three million cubic meters are produced annually, is sold for public consumption. The East Brazilian Federal Railway is to build a pipeline from Aratú to a thermo-electric station for the electrification of the railroad.

The three skimming plants in Rio Grande do Sul (two) and San Paulo (one) continued to function during 1949, producing between four and five million gallons of ordinary gasoline, approximately one million gallons of kerosene, upwards of 16,000 tons of diesel oil and 20,000 tons of fuel oil, besides raw materials for asphalt, dissolvents and lubrication.

A rudimentary refinery at Aratú, Bahia, belonging to the National Petroleum Council, processes about 16,000 barrels of crude oil annually to supply the Council's requirements of gasoline, kerosene, diesel and fuel oils.

At the end of 1949 work was started by The M. W. Kellogg Company on Brazil's first modern refinery at Mataripe, Bahia, the cost being now estimated at $2,875,000 U.S. Staff is being brought from the United States in order to complete the installation in 1950, before President Dutra's term of office expires. The plant will process the oil from the Bahia wells and will have an initial capacity of 2,500 barrels, to be raised to 5,000 later. It is located alongside the Candeias field and will receive crude from D. Joao in pipes and from Itaparica in tank lighters via the Mataripe River. Petroleum products will be carried in ducts to the shipping port at Mataripe, whence they will be distributed in national ships to northeastern Brazil. The refinery will be exploited by the Refinaria Nacional de Petroleo S.A., a company to be formed with mixed state and private capital.

In July 1949 the National Petroleum Council concluded negotiations for a thermal-cracking unit to process 45,000 barrels daily, to be owned and exploited by the Federal Union. Contracts were signed with Bechtel Corporation to act as consultants, with Pan American Hydrocarbon Research for planning, engineering and supervision, and with the French consortium, Fives-Lille and Schneider for material and equipment. The total cost of the work is estimated at $60,000,000 U.S. The plant will be erected at Cubatao, alongside the railroad from the port of Santos to the city of San Paulo.

In November the National Security Council approved concessions to two private Brazilian companies, the Refinaria e Exploracao de Petroleo Uniao and Refinaria de Petroleo do Distrito Federal, to install refineries with crude capacities of 20,000 and 10,000 barrels at San Paulo and Rio de Janeiro respectively. The former will be acquired in Czechoslovakia, the planning and supervision to be carried out by Hydrocarbon Research Inc., and will be installed at Capuava. The other, which will be located at Manguinhos on the Rio-Petropolis road, will be purchased in the United States and erected by the Foster Wheeler Corporation. Both will process imported

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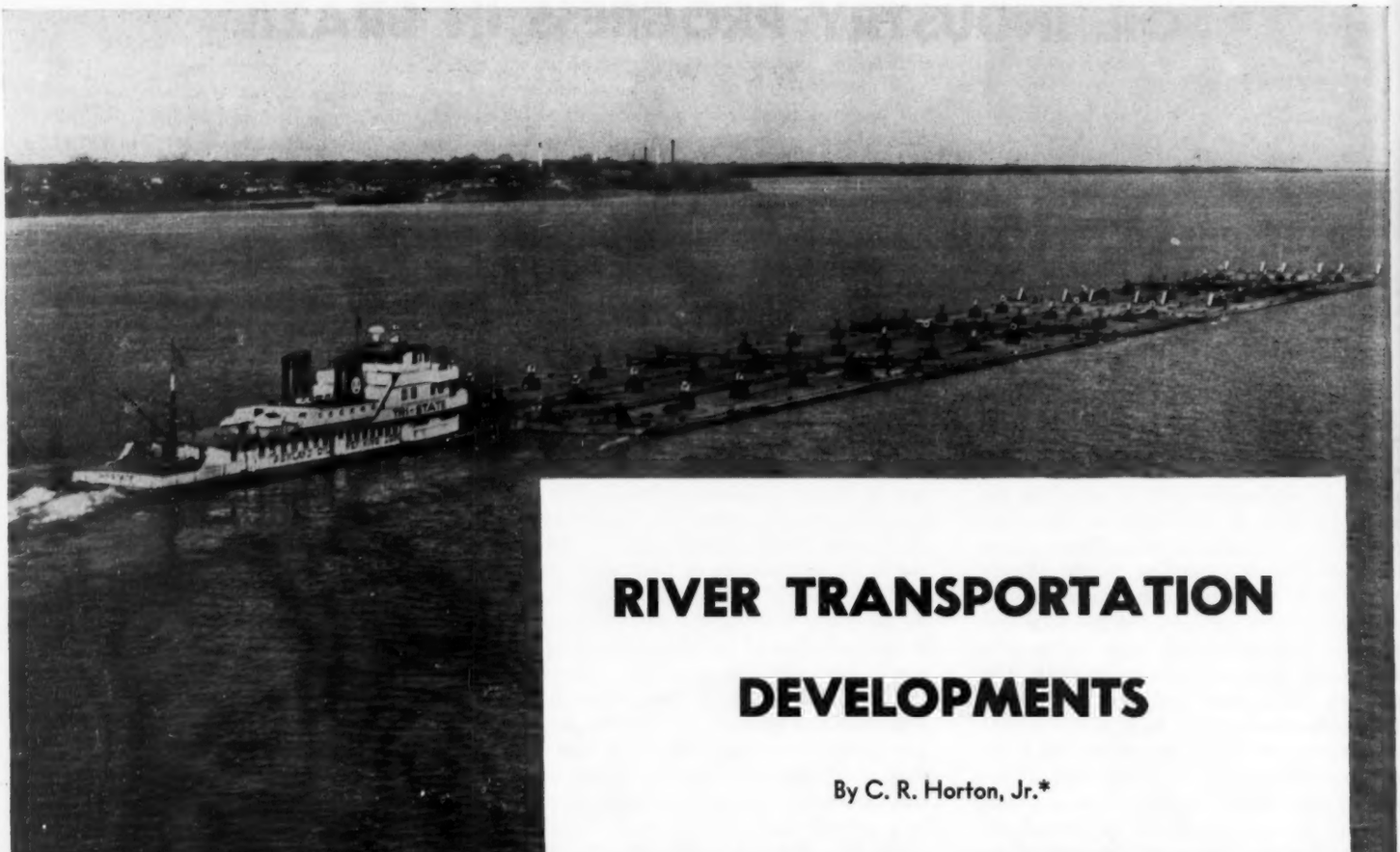


RIVER TRANSPORTATION DEVELOPMENTS

By C. R. Horton, Jr.*

With a capacity greater than that of a T-2 Tanker, this semi-integrated, 15-barge tow measures over 1,100 feet in length. To enable it to handle this large tow efficiently and to provide maneuverability to negotiate difficult river bends, the vessel was fitted with a completely new stern, propellers, steering gear, rudders and Kort nozzles.

THE POSTWAR period has seen the application of many important engineering developments in transportation of petroleum products on inland waterways. In fact the oil industry for many years has been the leader in the application of new ideas to river transportation. The great expansion of petroleum tonnage on the rivers was a contributing factor to this leadership, but a large part must be credited to the unusual disrespect for tradition in the oil industry in its competitive search for lower costs.

The main problem of the oil industry in using waterways seems to be in evaluating the lower costs that can be obtained and the resultant place of such transportation in the overall rather complex picture in which inland waterways compete with pipelines, ocean tankers, railways and trucks. Water transportation has survived because of a general downward trend in costs, while competing forms of transportation have been experiencing increased costs. This has been largely due to the application of new methods to barge, towboat and terminal operations with resultant increased efficiency of equipment.

In the United States the barge design field has seen the most spectacular of recent developments. The most publicized development which has been fairly generally adopted is the integration of barges into fleets without the usual formed ends at the connections. While not a new idea, its use carried with it a multitude of operational problems which had to be worked out on the river. The effect of integration varies considerably with the size and complexity of the fleet, but in general it reduces resistance about 25 percent and increases cargo capacity, all without increasing the cost or the barges themselves. A typical comparison is shown in Chart 1.

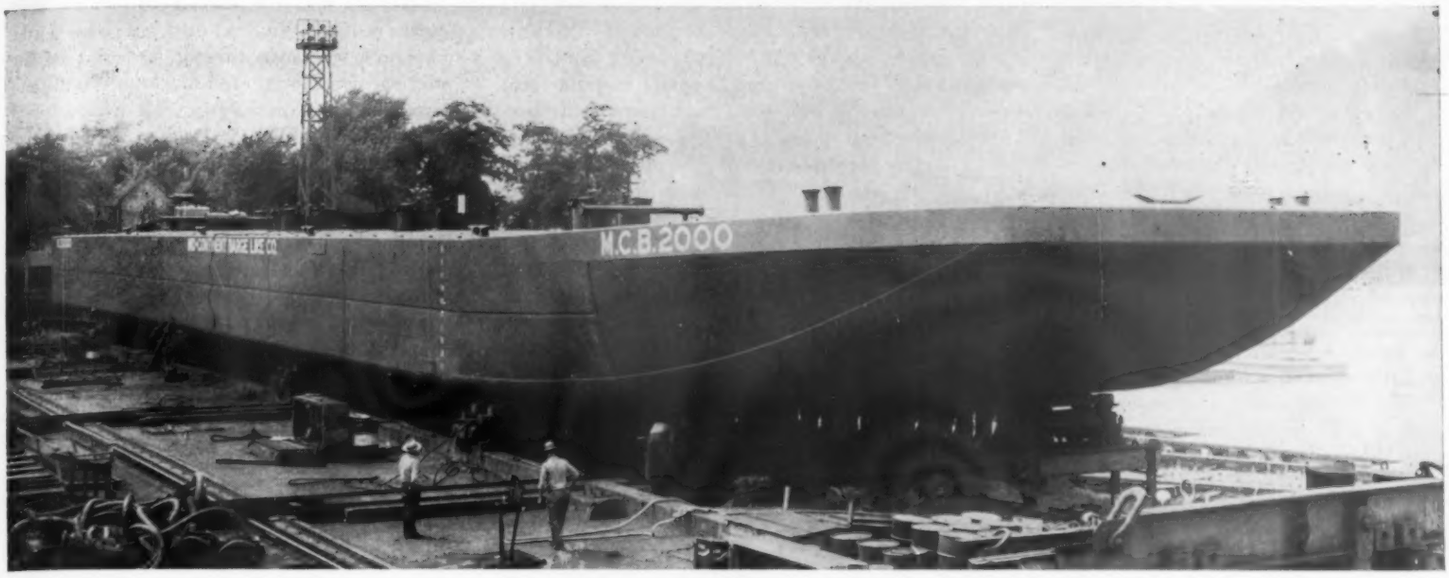
The operational problems which still remain are largely related to flexibility of operation, since the square ends are not low in resistance when exposed by the loss of a mating barge, due either to damage, dropping of a single barge at an intermediate terminal or the necessity of reducing the fleet for maneuverability or extreme current conditions.

The semi-integrated fleet consists of barges with one square end and one shaped end, operating as pairs, and arranged in any desired combination. This system, or a variant of it with middle box units, has been adopted by one of the largest operators for upstream crude movements from several different terminals. The performance of this type tow is somewhat lower than a fully integrated unit, but its flexibility has substantial values in use. Operators can break up the tow into smaller units during high water periods to pass local bad spots and are able to drop off or pick up pairs of barges. A tow can thereby be designed closer to its most efficient speed.

In smaller tow sizes, predicated on the tonnage available and terminal facilities, the fully integrated tow is undoubtedly advisable, but these smaller tows do not compete in cost with the large units. The small capacity two- or three-barge tow of 30,000 to 60,000 barrels has been generally integrated. The development of integration can be said to have made it possible for the small capacity tow to remain useful. The value of size of unit alone must not, however, be overlooked, since the largest semi-integrated oil tow now operating, carrying 22,000 tons or 155,000 barrels of crude in fifteen 195 by 35-foot barges, can do so at costs per ton-mile roughly two-thirds of the typical 30,000 or 40,000 barrel tow of two 240 by 50-foot or 290 by 50-foot barges.

Another approach to the integration problem is the construction of a hull with the power unit integrated with the barges. This method offers

*This article by Mr. Horton, naval architect for Dravo Corp., Pittsburgh, Pa., is a condensation of a paper prepared by him for presentation before the recent petroleum mechanical engineering conference of the American Society of Mechanical Engineers.



Leading unit of a two-barge tow for high speed movement of petroleum barges. Combined capacity of the two barges is 40,000 barrels.

the ultimate in low resistance per ton but in turn introduces still further operating difficulties. It would appear to be a logical end to the progress now being made for certain through trades, with very low costs being possible.

The subject of barge form in the rake ends has received much attention. There is a tendency to feel that there is some one ideal rake form, but this actually is far from the case. In fact, the rake that produces the lowest resistance per ton displacement is not necessarily the best if it involves a loss in total displacement for barges whose overall size is restricted. Both of these are usually the case. Some progress has been made in the direction of producing low resistance forms that can be economically constructed, but the progress here, while important, is relatively small compared with the gains due to integration and to choice of barge size.

The thinking concerning barge size has undergone a considerable overhauling in recent years. The old standard river barge was 175 by 26 feet and designed with a form suitable for operation at about six to seven miles per hour at 7½-foot draft. Later construction produced the 195 by 35-foot barge designed for approximately the same speeds and draft. Construction more recently has concentrated on the latter size, designed for up to nine-foot draft and for speeds up to 12 miles per hour, and on the 240 by 50-foot and 290 by 50-foot sizes with similar characteristics. Improved river conditions and increased power of towboats have brought about these changes, and with them lower costs per ton of capacity and greater capacity per barge, together with less resistance at economic speeds. The larger barge sizes are particularly suitable for use with fully integrated fleets that cannot be readily broken up, yet the 195 by 35-foot size offers greater flexibility at somewhat higher cost per ton or barrel. The large barges introduce some structural problems which are now being recognized and met by special rules for tank barges by the American Bureau of Shipping.

The essential principle underlying the push tow-

Typical Mississippi River towboat used for moving petroleum products. This vessel and a sistership, the Esso Louisiana, were completed at Dravo Corporation's Pittsburgh shipyard in 1948.

ing system used on American waterways is that the cargo-carrying barges and the towboat, or propulsion unit, are integrated and operate as a single ship. This method allows the precise control necessary for navigation of crooked rivers with high currents and restricted locks. With this control it is possible to handle large tonnages with low power, at the same time securing advantages in resistance and propulsive efficiency. Therefore, a river towboat cannot be considered an independent vessel but only as a part of its accompanying barges.

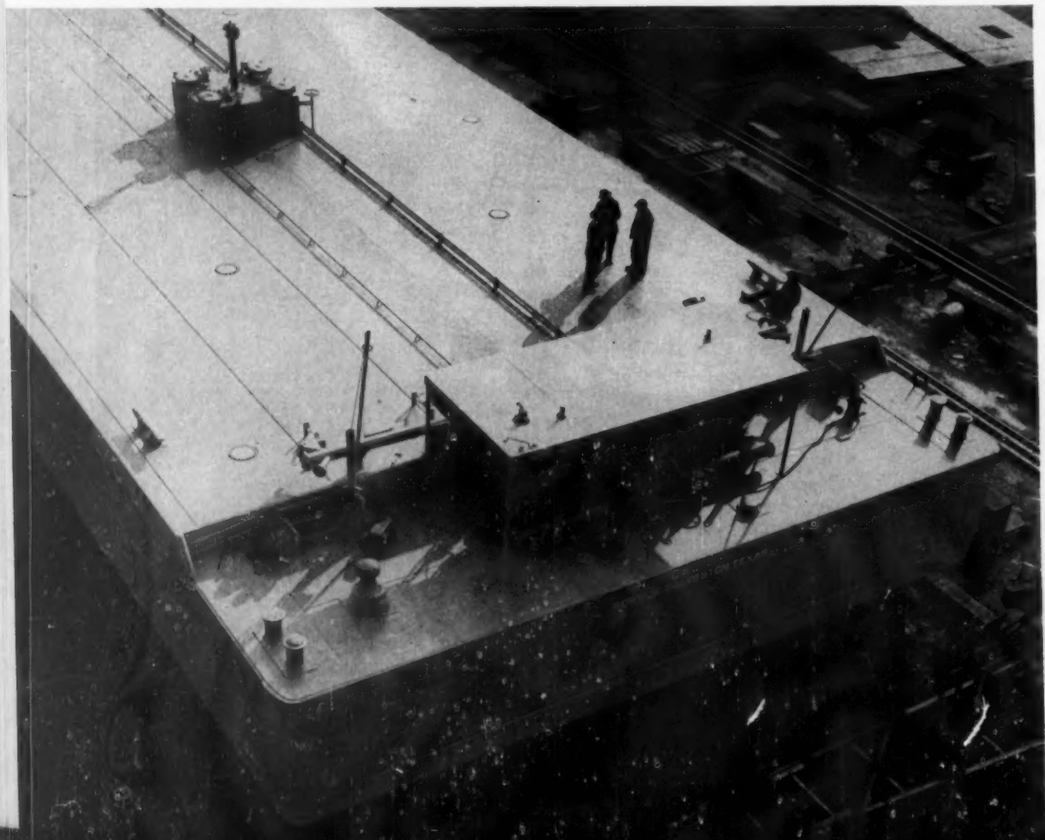
An aspect of towboat design that has received too little attention is maneuverability. The effect of poor steering ability is surprising, causing as much as a 25 percent loss in towboat performance. When one realizes that this traffic involves steering a 25,000-ton tow longer than the "Queen Mary" with two rudders of less than 150 square feet total area around bends with a radius of two or three tow lengths in currents equal to the boat's speed, the maximum steering forces obtainable are not great enough to give any peace of mind. Various complex schemes for greater steering power have been suggested or tried. The modern Kort nozzle propeller boat using two or more screws and independent three-rudders-per-propeller steering offers the simplest and most effective steering and propulsive method so far available. Typical large installations are shown in accompanying photographs.

The great loss in overall performance due to poor steering probably stems from a number of causes. Excessive backing or flanking around bends, loss in push with overuse of large rudder angles, and need for extra caution in approaching obstacles constitute the principal factors. More important than this loss under comparable conditions is the necessity of operating with tows too small for the power of the boat. By this is meant speeds in excess of the economical speed, and shorter and wider tows to permit steering. These things can make enormous differences in output with a given power. To secure good maneuverability with high efficiency is one of the most expensive improvements that has been made. One must set standards requiring heavy, reliable steering mechanisms, carefully formed hulls and streamlined rudders and struts, all combined with the Kort nozzle. The extra dollars, however, pay larger dividends than any other aspect of towboat design.

Mention has been made of the importance of considering the towboat and its barges as a unit. An example of this is shown on Chart 2, which demonstrates the effect on cost of varying speed through the water, (or in actuality towboat power versus fleet size), with varying current conditions. This chart also was prepared for a typical petroleum towing problem.

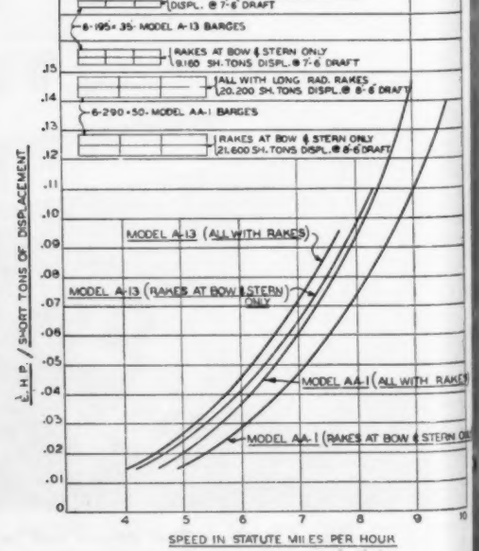
The marine engineering phases of towboat design have made considerable progress in recent years. The petroleum movement has greatly increased the upstream tonnage without accompanying downstream cargo, so the power of towboats has

These two 19,000 barrel capacity tank barges transport gasoline to midwestern points along the Mississippi and Illinois Rivers. With the barges turned in opposite directions in the picture, both the deep transom stern and the elevated bow can be seen. Bow design permits headlogs to ride high out of the water when barges are loaded.



Stern view of a new 290-foot long, articulated tank barge. The deck-mounted pump can strip the barge dry at an operating capacity of 3,000 barrels per hour. ←

Chart 1—Comparison showing typical results of barge integration. ↓



been increased. Ten years ago a 2,000 hp towboat was a rarity. Now 3,000 hp boats are fairly common, with a few vessels over this size.

Two types of diesel power plants are coming to the forefront, namely the higher speed, two-cycle blower supercharged and four-cycle Buchi supercharged engines. The increased speed of these units has forced the general adoption of reduction gear drives, permitting the use of larger diameter propellers suitable to the power and available draft, whereas the older, direct connected engines usually forced a compromise between engine and propeller detrimental to efficiency. The high speed and war-encouraged modern engineering of these diesels has led to a great reduction in weight for a given power, even including the gearing, allowing the construction of smaller, less expensive boats with improved efficiency.

The great increase in labor costs has fostered the development of new control systems to allow the pilot to handle the engines directly, thus freeing the engineers for maintenance work, with a resultant reduction in engine room personnel. These control systems have used mechanical, electrical and air systems and have been very successcessful. The better control afforded pilots has brought about more output and fewer accidents.

The simplification possible in a diesel engine by eliminating reversing has always been attractive. This has been accomplished by the development of new reverse gear units using mechanical, air actuated, and eddy current clutches, in the large sizes necessary for the larger powers being used. These, combined with the control features and reduction gears, have produced propulsion units that are reliable, moderate in cost and allow use of the most efficient propellers within the draft limitations.

The auxiliary equipment of towboats has changed less than the main power plant. Various new devices have been introduced such as deck winches for handling wire connections, skin coolers, oil purifying equipment, distillation plants for drinking water, deep freeze food lockers and improved efficiency of electric plants by the use of AC current. The major changes that contribute to lower operating costs or greater output have, however, been applied to navigation, with almost complete adoption of three centimeter radar units and radio telephone. Less generally used are fathometers and automatic steering devices. The elimination of delays due to fog, the improved navigation at night and very real value of direct communication between boat and home office have greatly reduced costs while improving the reliability of river transportation. The use of gadgets, as such, on marine equipment is usually unsound due to the maintenance problems involved, but those mentioned have proved themselves because the maintenance problem has been recognized and intelligently handled.

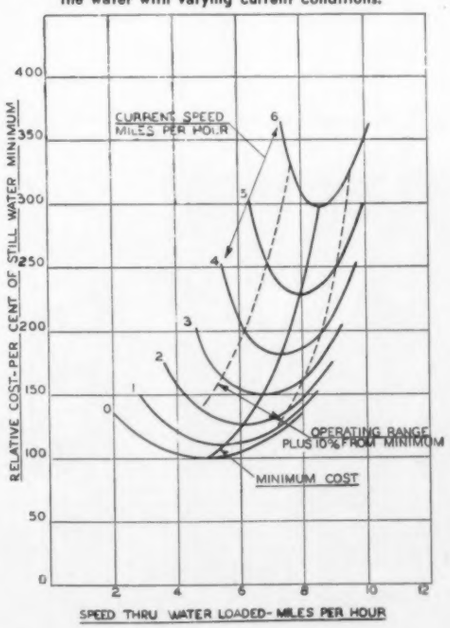
The process of loading and unloading petroleum products for shipment by river has been altered only slightly in detail. Most oil-moving operations are of such distance that it is not economical

Poor steering can cause as much as 25 percent loss in towboat performance. Kort nozzles, above, combined with rudders of the proper size, shape and location give maximum maneuverability. The backing rudders, two to each propeller, are visible in this view looking aft through the nozzles.

Typical Kort nozzle and rudder installation on twin-screw river towboat.

to provide exchange of fleets to give, in effect, floating storage, but this possibility is often overlooked in following tradition where it would effect economies. The larger terminals require increased pumping rates, and this has been accomplished in numerous ways.

Chart 2—Effect on cost of varying speeds through the water with varying current conditions.



A fundamental in designing pumping systems is the location of the pump, either on the barges or on shore at the terminal. The recent trend is not clear on this point, and both systems are being used. The improvement in terminals should lead to placing barge pumps at terminals, on floating wharf barges. This will reduce the investment and eliminate costly and intermittent maintenance of pumps on barges. The added depth now common in barges due to the increased drafts generally available leads to increased suction lifts for terminal pumps, whereas barge-mounted pumps of the vertical rotary, centrifugal or mixed flow types with below-deck piping, can operate on any barge depth. An oil barge carrying volatile gasolines or solvents with 15-foot suction lifts and 130 degree deck temperature sometimes cannot be stripped. This problem alone may require barge-mounted pumps.

The newer vertical mixed flow barge pumps driven by deck-mounted engines seem to offer many advantages over the usual deck-mounted rotary units. They are more economical to buy and to maintain and are much smoother running. They offer great flexibility in capacity with varying discharge heads. By various more or less complex piping arrangements, they can be made to strip barges successfully. The trend seems in this direction, for refined products barges, with the rotary pumps handling the heavier and more viscous materials.

SHELL CHEMICAL PLANT

AT PERNIS

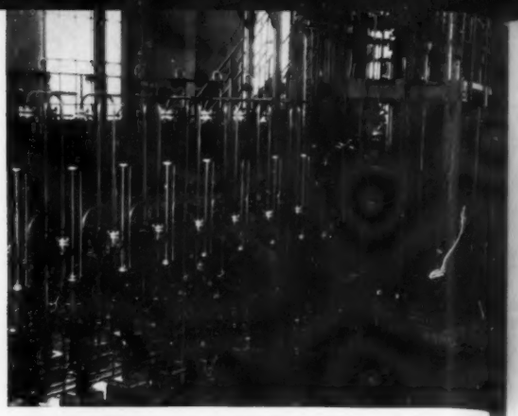


Fig. 1. Interior view of polymerization unit where the final polyvinyl plastic is formed.

TESTIFYING to the importance attached to the newly completed petrochemical plant of the Royal Dutch-Shell Group at Pernis, Rotterdam, the Netherlands, Minister of Economic Affairs, Prof. J. R. M. van den Brink officiated at the formal opening. The plant is operated by Bataafsche Petroleum Maatschappij, a Royal Dutch subsidiary, and forms part of the Group's 170 million guilder ($45 million) postwar construction program in the Pernis-Rotterdam area.

One section of the chemical plant will produce synthetic detergents and the other plastics. Both are important industrial products, and the production of detergents from petroleum serves a particularly useful purpose in Europe at the present time by releasing for food use scarce supplies of edible fats. Of the accompanying illustrations, Fig. 1 is an interior view of the polymerization unit where the final polyvinyl plastic is formed by separation of the residual monomer from the polymer suspension. Fig. 2 shows in the foreground part of the maze of pipes in the distillation unit. In the background are the columns in which the purification of the dichloroethane and the processing of the product of the crude pyrolysis reaction are carried out.

Production from the new Pernis installations marks a further stage in the Royal Dutch-Shell Group's program of expansion in the petroleum-chemical field. The industry, using petroleum as its raw material, is one which the Group has pioneered since 1930. Large plants in the United States and another put into operation at Stanlow, England, during the past year are producing important chemicals, including much-needed supplies of synthetic glycerine and industrial alcohol.

Since the gases produced as a byproduct of refinery operations, particularly catalytic cracking, are the raw material of the chemicals-from-petroleum industry, chemical plants, are wherever possible, sited close to refineries. At Pernis Royal Dutch-Shell's nearby Rotterdam refinery will provide all the raw materials required when the present refinery expansion program is completed by 1952. The proposed extensions include a distillation unit of about 6,000 tons daily intake, a high vacuum installation, a catalytic cracking unit of about 3,000 tons daily capacity and a reforming unit. Tankage capacity, which is now 700,000 tons, is being increased by new construction to 1,100,000 tons. It is estimated that the total labor force for both refinery and chemical plant will ultimately be 2,600.

In the detergents section the base material used is paraffin wax. After "cracking" and treatment with acids and alkalis, a liquid is finally obtained which can be used as a detergent or evaporated to form flakes or powder. The resulting product has some striking advantages over ordinary soap. Its washing effect commences even at low temperatures; it lathers well in salt water; it has a solvent effect and great powers of penetration into the fibres of materials; and no lime soap deposit is left on the materials after washing.

In the manufacture of plastics (poly-vinyl chloride synthetic resins) the base materials are cracked gas and chlorine. Poly-vinyl chloride belongs to the group of thermo-plastics. By applying pressure and heat, it can be molded into sheets, plates, tubes and other products. It has great resistance to acids and alkalis.

Much painstaking research has gone into the manufacture of efficient equipment for these plants. Special metallic alloys are used in the pipelines, pumps and tanks, because of the corrosive nature of the materials processed. Also the high standard of purity, which the intermediate and final products have to satisfy, has called for numerous provisions against contamination.

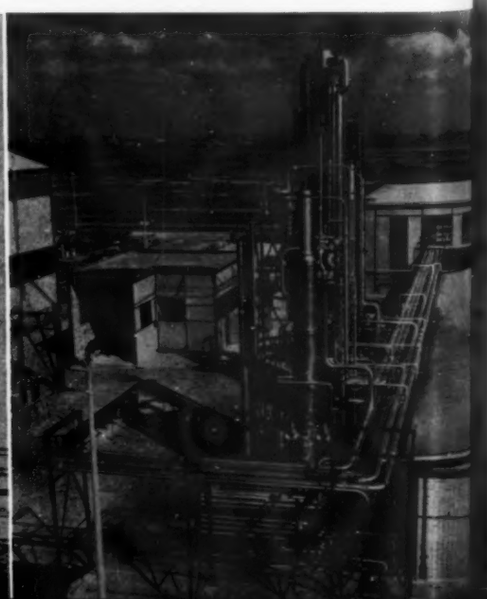
The output from Pernis will be supplied as a base material for industry, and the new plant will make a valuable contribution to the industrialization of the Netherlands.

In his speech delivered at the opening, Prof. van den Brink referred to the splendid progress that has been made in industrial rehabilitation since the end of the war in Holland and western Europe. The Minister also stressed the need for increased research in Dutch industry and said that the new installations at Pernis were the outcome of such research. But he warned against the unmistakable change-over in world commerce from a seller's to a buyer's market and pointed out that only those countries which could offer fine quality goods at low prices would be able to maintain and increase their standard of living. The Minister expressed his firm conviction that Shell's new plants, by supplying important basic materials for many Netherlands industries, will play a notable role in achieving this objective.

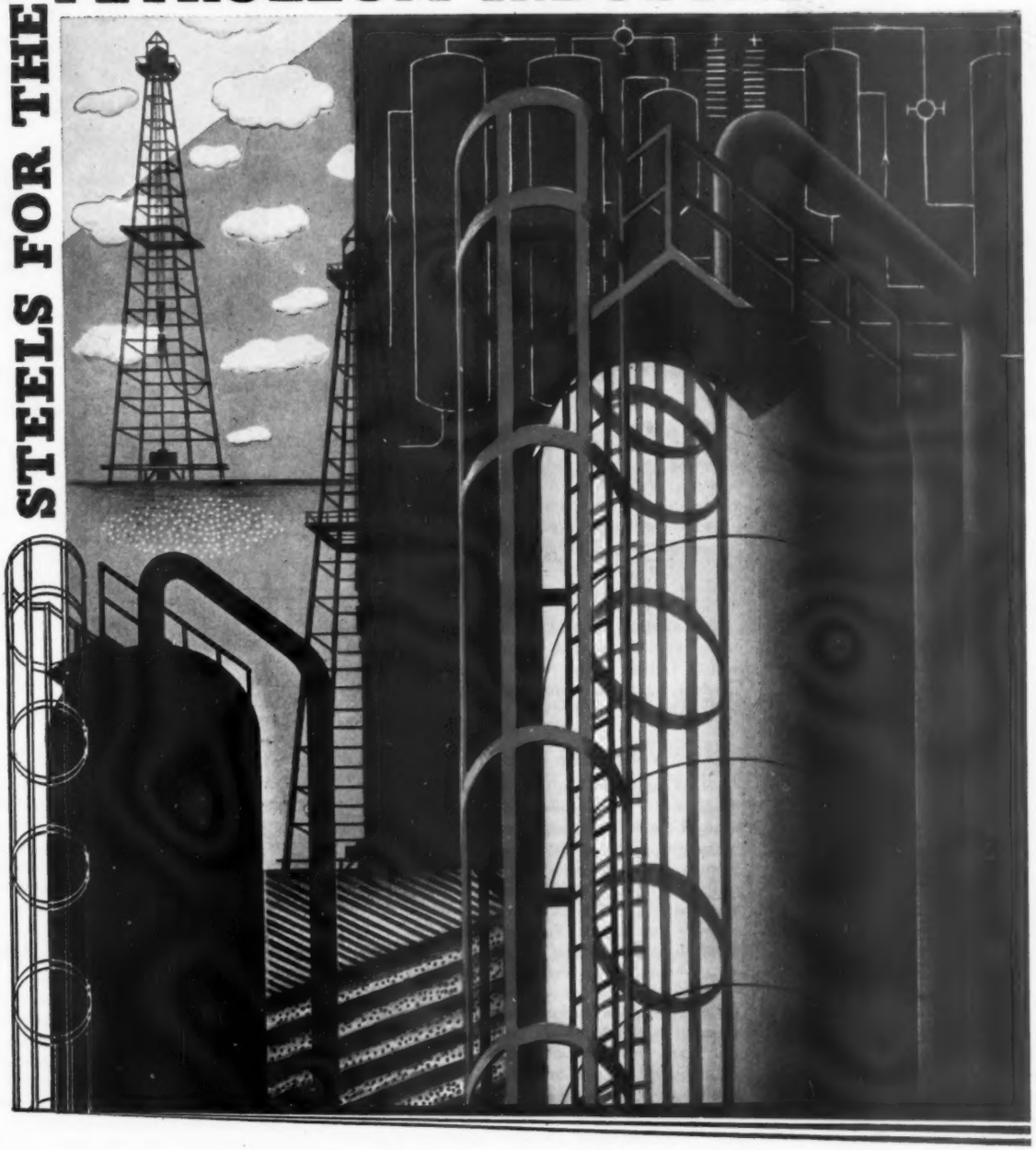
Partial view of PVC plant with ester salts plant in foreground.

Fig. 2. Distillation unit with columns used for purification of dichloroethane.

Distillation columns and pumphouse of polyvinyl chloride plant.



STEELS FOR THE PETROLEUM INDUSTRY



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International News and Notes

H. S. Gibson

Gibson Heads Iraq Petroleum

H. S. Gibson has been appointed managing director of the Iraq Petroleum Co. Ltd. and associated companies on the retirement on Dec. 31 of J. Skliros. After his service in the first World War, Mr. Gibson joined the (then) Anglo-Persian Oil Co. Ltd. as production engineer, being promoted to production superintendent in 1928 and to production manager two years later. He was appointed assistant fields manager (production) in 1932; assistant general fields manager (production) in 1944, and general fields manager in 1945. On his return to England in 1949 he took charge of the Anglo-Iranian Oil Company's research station at Kirklington Hall in Nottinghamshire.

Mr. Gibson was awarded the C.B.E. in 1947, in which year the Institute of Petroleum conferred upon him the Redwood Medal in recognition of his pioneer work on the control of limestone reservoirs and the multistage stabilization of gas.

At his retirement Mr. Skliros had been with the company 25 years, during 15 of which he was managing director. In commercial life in Basrah Mr. Skliros had acquired a knowledge of local conditions and people before World War I. In 1915 he became political adviser to the Mesopotamian Expeditionary Force and later A.D.C. to General Maudie on his appointment as Commander-in-Chief. After the war he became adviser to the minister of commerce in the mandatory government of Iraq.

In 1923 Mr. Skliros became associated with the Anglo-Persian Oil Co. in connection with the projected refinery at the confluence of the Diyala and Tigris rivers to supply the oil requirements of Iraq. He came to the London office of the Anglo-Persian in the following year as assistant to the late H. E. Nichols, then chairman of the Turkish Petroleum Co., and was intimately connected with the negotiations which culminated in the Turkish Petroleum Co. concession in 1925. In January 1930 he became acting general manager of the Iraq Petroleum Co. in succession to Sir Adam Ritchie, becoming general manager in 1931 and managing director in 1934.

In 1931 Mr. Skliros negotiated the revision of the Iraq Petroleum Company's concession and transit concessions for the construction of the pipelines through Trans-Jordan, Palestine, Syria and Lebanon. In 1938 he negotiated the Basrah Petroleum Company's concession.

He is *persona grata* with both the rulers and the peoples of the vast and diverse territories which extend from the Mediterranean to the Persian Gulf, and it was largely due to the respect in which he is held throughout the Arab world that oil concessions were obtained in Trans-Jordan, Palestine, Syria, the Lebanon, the Trucial Coast, Oman and Dhofar, the Hadhramaut and western Arabia.

Mr. Skliros played a major part in the formation of the companies organized by members of the IPC to operate these concessions. Embracing British, Dutch, French and American interests, they are a unique example of international cooperation in oil. The evolution of a harmonious company policy has in no small measure been due to his genius for compromise; never allowing the practical to wait upon the perfect, but reconciling apparently conflicting interests without sacrificing any point of principle.

Bahrein Production

Production of crude oil in Bahrein during November 1949 was 906,501 barrels, or 30,217 barrels daily.

Brazilian Oil Fleet

The Brazilian government commission, which has been visiting Stockholm, has examined 106 tenders and accepted proposals for ten tank ships of 16,500 tons each and 19 small vessels of 2,000 tons for coastwise and river traffic. Six of the large ships will be supplied by Swedish firms. One, the "Venus," was launched in 1949; two will be built in the yards at Uddevalla and one at Gotaverken, Gotemburg, for delivery in 1951; the remaining two will be built in the Lindholmen yards, Gotemburg, and will be ready in 1952. These six ships will cost Brazil 243,100,000 cruzeiros, equivalent to $13,127,400 US. Four other 16,500-tonners will be purchased in England, and nine of the small tankers will be built in Japan. No information has been supplied as regards the remaining ten vessels for coastwise traffic.

Venezuelan Appointments

G. H. Westby, president of Seismograph Service Corp. of Delaware with home offices in Tulsa, has announced the following appointments in Seiswell, which is the well servicing division of SSCD: Hamilton M. Johnson, division manager with headquarters in Caracas; Jay G. Beaver, district manager of the El Tigre area; William H. Plowman, sales and service engineer for eastern Venezuela; and M. L. Richmond, senior shooter in charge of the Jusepin area. Mr. Johnson joined Schlumberger Well Surveying Corp. in 1937 and was transferred to Venezuela to assume charge of Schlumberger-Surenco, S.A., operations in central Venezuela in 1945. He joined SSCD two years later and returned to the United States for additional training in radioactivity logging. Upon returning to Venezuela, he assisted in all well servicing operations offered by Seiswell. His appointment as division manager will place him in control of gamma ray, neutron, mud and electrical logging, jet perforating, mud control, core analysis and caliper service for core drill work, all of which are services now offered to clients by Seiswell.

Mr. Beaver was employed by SSC in 1947 to conduct radioactivity logging operations in connection with seismic work and was transferred to Seiswell in May 1948. Mr. Plowman was transferred in 1948 from SSC to Seiswell in Venezuela where he was given an opportunity of gaining practical experience in all phases of the well servicing offered by Seiswell. He has been particularly active in jet perforating and radioactivity well logging. Mr. Richmond has had many years of experience in the jet perforating field as an employee of both the McCullough Tool Company and Welex Jet Services Inc. He joined SSCD in February 1949 and was sent to Venezuela as a jet perforating shooter.

Felix F. Blanco

Studies Gas Line Operations

The Argentine government, which recently completed a 1,100-mile natural gas pipeline, has sent Felix F. Blanco to the United States to study the operation and maintenance of large natural gas pipelines.

Mr. Blanco is one of the top technicians of the Argentine Government Gas Service Department. He was chief inspector in charge of the supervision of the manufacture of the steel pipe in Argentina used in the new gas line. Due to his great perseverance and experience in that particular line of work, it was possible to fabricate steel pipe in Argentina similar to that manufactured in the United States. He also served as chief of the cathodic protection service division.

Mr. Blanco is considered the greatest authority in Buenos Aires on steel pipe fabrication and is also considered an expert in pipeline instrumentation. He was recently appointed chief of maintenance and operation of the President Peron gas pipeline. The University of Buenos Aires made him an honorary member of that institution in recognition of his work on the line.

A. W. Lawson Retires

A. W. Lawson has retired after more than 43 years with the Shell group of companies. He was first manager of the development department of Shell-Mex Ltd. and carried out the company's depot building program of the 20's. In 1936 he was appointed assistant general manager of Shell-Mex and B. P. Ltd., and at the outbreak of the war he was made chief operating officer of The Petroleum Board. His services brought him the O.B.E. in 1943 and the C.B.E. in 1948. The United States government also recognized his services by awarding him the Medal of Freedom, Bronze Palm. In 1944 he became deputy general manager of Shell-Mex and B. P. and was appointed a director the following year.

New German Oil Find

In the oil district Heide-Meldorf (Province Schleswig-Holstein) a new discovery has just been made by Deutsche Erdoel-Aktiengesellschaft. The well, M 88, struck oil at a depth of 4,200 feet in the Zechstein formation (Palaeozoic). Although a narrow two-millimeter valve was used, the well gave an initial flow of 30 cubic meters of good quality (light) crude per day. The well is situated close to the sea dike west of Meldorf town. It is supposed that the newly discovered oil field extends toward the west into the area beyond the dike towards the sea.

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INTERNATIONAL TRUCKS

Plans for World Petroleum Congress

The Petroleum Section of the Netherlands Royal Institute of Engineers in The Hague has accepted an invitation to organize the Third World Petroleum Congress, after securing the support of the Netherlands oil industry. The organizing committee was formed with G. A. Tuyl Schuitemaker as chairman, J. A. Beukers, treasurer, and J. W. Zwartsenberg (30, Carel van Bylandtlaan, The Hague), secretary.

The congress will be held in The Hague-Scheveningen, from May 28 to June 6, 1951. The members of the congress will be accommodated at the main hotels of The Hague-Scheveningen. The sessions of the various sections of the congress will be held in three halls of the Kurhaus Hotel.

National committees are being formed in each country to invite, collect and screen reports from their country. These reports (each accompanied by a summary) will finally be forwarded to the organizing committee in the Netherlands. The official languages at the congress will be English and French. All reports have to be submitted in one of these languages or in both.

The purpose of the congress will be to focus attention on the present position of science and technique in the petroleum industry. In principle there will be ten master sections at the congress:

1. Geology, geophysics, geochemistry
2. Drilling and oil production
3. Physical technology
4. Oil processes involving chemical conversions
5. Production of chemicals from petroleum, their properties and applications
6. Measurement and control, testing, chemical analysis
7. Utilization of oil products
8. Construction of equipment, materials, corrosjon
9. Transport, storage, distribution
10. Economics, statistics and documentation.

These sections will discuss papers submitted by petroleum experts of international standing. The General Reporter of a given section will read abstracts from the papers under consideration and suggest topics for discussion. These discussions and the conclusions reached will also be published in the proceedings of the congress.

Those taking part in the congress will find an opportunity of studying the Netherlands—not only by excursions to its petroleum and other industries, but also by tourist trips to typical Dutch towns and rural districts. A ladies' committee will arrange for the reception and entertainment of lady visitors during their stay in the Netherlands. A pamphlet, giving full particulars, will be available in the beginning of 1950.

Second Mexican Well Spudded

Mexican American Independent Co., known as CIMA, spudded in its second well in Mexico for Petroleos Mexicanos on December 6, 1949, Ralph K. Davies, president, American Independent Oil Company de Mexico, S.A., announced. CIMA is the operating organization for American Independent Oil Company, Signal Oil and Gas Company and Edwin W. Pauley. CIMA encountered an oil-bearing horizon which indicates that this well, when completed, will prove to be a satisfactory producer. Recent tests were at a rate of 1,170 barrels daily at 4,100 feet.

The new well, known as Xicalango #1, is located in the middle of an isolated swamp on the north coast of the Isthmus of Tehuantepec in the State of Tobasco and 150 miles from the closest producing areas in that state and in Veracruz, and thus represents a true wildcat venture in virgin territory.

The second well operation resembles early developments in Louisiana and East Texas, Mr. Davis stated. This entire operation is self-sufficient. A light plant, water system and complete living facilities for the crew had to be established before the rig could be assembled. All equipment was brought by seagoing vessel to Coatzacoalcos, Veracruz, then transferred to a shallow-draft LCT and moved through a canal cut in the marshlands by CIMA to within a short distance of the drilling site.

Taking advantage of a series of ancient "cues" or mounds built by Mayans, CIMA constructed a road through dense jungle swampland from the canal's end to the rig location.

New Egyptian Refinery

The Egyptian government recently announced its acceptance of the tender of the Lummus Co. of New York for the enlargement of the Suez refinery. This operation will increase the productive capacity of the refinery from 7,000 to 28,000 barrels daily. The new plant should be ready early in 1951.

Exploration in British Honduras

A permit to explore for oil in British Honduras including offshore areas has been granted to Bahamas Exploration Co. Ltd.

Shell Experimental Farm In England

The questions of the production of insecticidal and fungicidal materials from petroleum, and the testing of their properties, as well as their use in conjunction with non-petroleum chemicals, form the major aims of the new experimental farm of the Royal Dutch-Shell Group at Woodstock in Kent, England. The farm is situated in the middle of one of the chief fruit-growing districts in Kent; and its area of 169 acres is sufficient to permit field testing of chemicals on a commercial scale.

Because of climatic and geographical limitations, the problems to be studied at the farm will chiefly be of interest to western Europe and the United Kingdom; at the same time much of the research will be of a fundamental nature. The soil is a loam, with flints overlaying chalk, and is well drained; the position precludes the danger of any serious damage from late frosts.

The farm is staffed by a team which includes entomologists, mycologists, chemists, horticulturists and engineers, all widely experienced in their special fields. In addition to the testing of insecticidal and fungicidal materials, the development of chemicals as selective and total weed-killers is another field of activity.

Spraying Trees At Shell Experimental Farm

New Directors

M. A. Colefax and P. H. Frankel have been appointed directors of Manchester Oil Refinery Ltd. The appointments were effective January 1.

Germany Produced 841,500 Tons Crude in 1949

According to preliminary production reports, German oil fields ended the year with a record output of over 80,000 tons in December, making a total of 841,511 tons (6,200,000 barrels) produced in western Germany in 1949. German crude production thus has been able to supply roundly one-third of the domestic demand.

The increase over the previous year is due in the first place to further exploration of the fields between the River Ems and the Dutch border. With a yield of approximately 132,000 tons, Georgsdorf heads the list of German fields, closely followed by Emlichheim with about 129,000 tons, and the well-known old oil district in the province of Hanover, Nienhagen-Haenigsen with about 125,000 tons. In Georgsdorf production has increased by 149 percent over that of the previous year; in Emlichheim by 99 percent, and in the third largest Emsland oil field, Lingen-Dalum, by 26 percent.

In the Hanover area yields have been maintained better than had been expected. In Steimbke near Nienburg (Weser) the output increased 44 percent; in December it amounted to more than 6,000 tons. In Wesendorf, Hademstoff, Broistedt, Oberg, Calberlah and Gifhorn, too, yields have risen. Against this in Eicklengen and Etzel (Ostfriesland) the gradual exhaustion of deposits made itself felt. The falling production rates in the older parts of the field group Nienhagen-Haenigsen were counterpoised by successful exploitation in Kuhlenberg and Haenigsen.

Good results were also achieved in the provinces of Schleswig-Holstein and Hamburg. The extension of the productive area in the Heide oil district and the application of secondary recovery methods brought about an increase of 7.5 percent over the previous year. Crude production in the Rhine valley in Baden decreased slightly.

As a result of deeper drilling activities by the producing companies, seven new oil fields were discovered in 1949. Several of these give promise of extremely good yields. In the Emsland district the rich deposits Ruehlertwist - Ruehlermoor and Scheerhorn were explored; in the province of Hanover Suderbruch, Eldingen and an extension of Kuhlenberg, and in Schleswig-Holstein Elpersbuettel near Meldorf and Hohenhorn.

During the past few months these new fields have yielded several thousand tons. With their help it will be possible, according to experts, to increase German production of crude to a rate of two million tons per year.

Total crude production in 1949 was 32.4 percent over that of the previous year and 52.5 percent over that of the last year before the war, 1938.

German Production in Tons
(Preliminary Figures)

	1949	1948
Emsland	324,940	167,847
Hanover	412,646	370,086
Schleswig-Holstein-Hamburg	98,024	91,267
Total Northwest Germany	835,610	629,200
Baden	5,901	6,040
Total Germany	841,511	635,240

Bahrein Production

Production of crude oil in the island of Bahrein during December 1949 was 939,603 barrels. For the year ending Dec. 31, production was 10,985,484 barrels, an average of 30,097 barrels daily.

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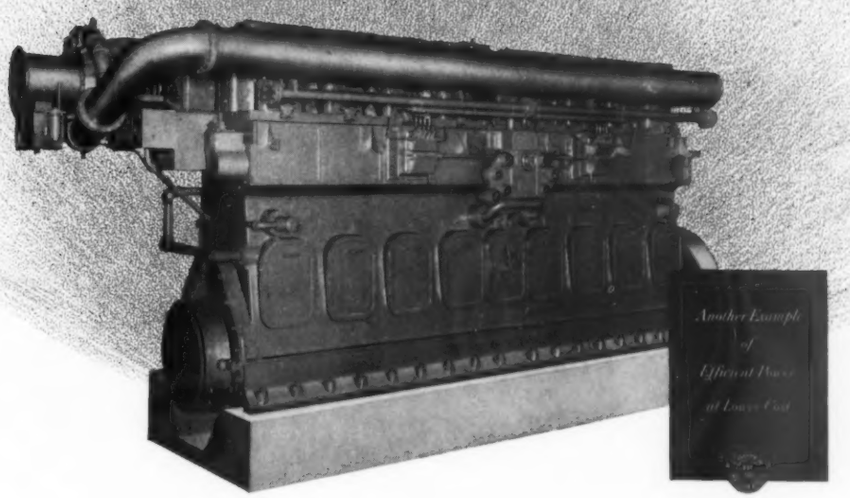

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Like ordinary gas engines, Cooper-Bessemer *supercharged* 4-cycle gas engines are spark-ignited, requiring no pilot oil charge. However, they offer at least 50% higher thermal efficiency, consuming less than 7,000 BTU per horsepower hour — easily a 30% saving in fuel.

Moreover, by successfully increasing brake-mean-effective pressure from the usual 70 pounds to 125 psi, the new supercharged engines produce 80% more horsepower. Thus any power need can be met with fewer or smaller engines, permitting additional big savings in installation, housing, piping, maintenance and normal operating overhead.

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OIL COMPANY STAFF CHANGES

Eger V. Murphree

EGER V. MURPHREE, president of Standard Oil Development Co., was awarded the Perkin Medal for 1950 at a dinner at the Waldorf Astoria January 6, in recognition of his outstanding contributions to the chemical industries. Dr. Marston T. Bogert, past president of the American section of the Society of Chemical Industry, made the presentation. Dr. Warren K. Lewis, former head of the department of chemical engineering of Massachusetts Institute of Technology, with whom Mr. Murphree once was associated at MIT, reviewed the accomplishments of the medalist.

Mr. Murphree joined New Jersey Standard in 1930 to develop chemical processes employing petroleum fractions as raw material. He is credited with contributing to a large number of petrochemical developments including fluid catalytic cracking, 100-octane gasoline, synthetic toluene, butadiene and hydrocarbon synthesis. During the war he served as a member of the Office of Scientific Research and Development S-1 Executive Committee headed by Dr. J. B. Conant. Mr. Murphree was in charge of the design of a heavy water plant in British Columbia and supervised much of the work on the centrifugal method of separating uranium isotopes.

F. RICHARD MILLER has been appointed a general supervisor of systems and procedures for the Gulf Oil Corp. He will have supervision of the comptroller's function in systems and procedures relating to the company's domestic marketing department.

H. J. STRUTH has resigned as assistant director of information for the American Petroleum Institute and is returning to Dallas, Texas, his former home. He will open his own office in Dallas as a petroleum consultant and economic advisor to various oil and gas organizations. Prior to joining the API in New York, Mr. Struth was editor of The Petroleum Data Book and formerly held the position of economist and executive assistant with the Texas Mid-Continent Oil and Gas Association at Dallas.

R. G. FOLLIS, vice chairman of Standard Oil Co. of California, has been elected chairman to succeed H. D. Collier, resigned. T. S. Petersen remains president. Mr. Collier joined the company in 1903 as a salesman. He was elected a director in 1924, vice president in 1931, president in 1940 and chairman in 1945. He is not retiring at this time but will continue to occupy his seat on the board and to act as chairman of its finance committee.

Mr. Follis joined Standard as a refinery engineer in 1924 and became successively director, vice president, president and vice chairman.

SCOTT E. DRUMMOND, chief of construction and maintenance for Esso Standard Oil Co., recently received official commendation for his wartime assistance to the Air Transport Command in establishing aviation fuel servicing facilities across the continent of Africa. A certificate of appreciation, signed by W. Stuart Symington, Secretary of the Air Force, was formally presented to Mr. Drummond by Maj. Gen. Laurence S. Kuter. Mr. Drummond spent 18 months during 1942-43 in the vital work of opening aerial supply routes.

J. L. MARTIN, vice president and director of pipelines for the General Petroleum Corp., retired Jan. 1 after 36 years with the company. He was succeeded by George H. Supple, manager of the pipeline department. Mr. Supple joined the company in 1924. He became pipeline manager in 1948.

L. F. KNOX, chief safety engineer of the General Petroleum Corp., retired Jan. 1 after 23 years' service with the company. He has been engaged in safety work since 1930 and has been chief safety engineer since April 1948.

HOWELL R. ADAIR has been named purchasing agent for the southwest production division of Sun Oil Company, succeeding Ira C. Jared who is being relieved of his primary duties at his own request after 31 years with the company. In announcing Mr. Adair's appointment, J. H. Pressley, division manager, said that Mr. Jared will remain with Sun to serve in an advisory capacity to the purchasing department he directed for the past quarter century. He is a former vice president of the National Association of Purchasing Agents.

C. H. WAGNER has been elected vice chairman of The American Oil Co. and its two subsidiary companies, Lord Baltimore Filling Stations Inc. and Mexican Petroleum Corp. H. C. Smith, formerly vice president, was elected president to succeed Mr. Wagner in all three companies. D. J. Smith remains chairman of the three companies. They are engaged in the marketing of petroleum products along the entire eastern seaboard.

After serving in various sales positions with Standard Oil Co. (Ind.), Mr. Wagner was elected general manager of The American Oil Co. and Lord Baltimore in 1937. He became vice president and general manager as well as a director in 1945 and president in 1947. Since 1927 Mr. Smith has been associated with Pan American Petroleum & Transport Co. and its marketing affiliates. In 1947 he was elected vice president and director of all three of the companies of which he now is president.

Left to Right: H. C. Smith, C. H. Wagner
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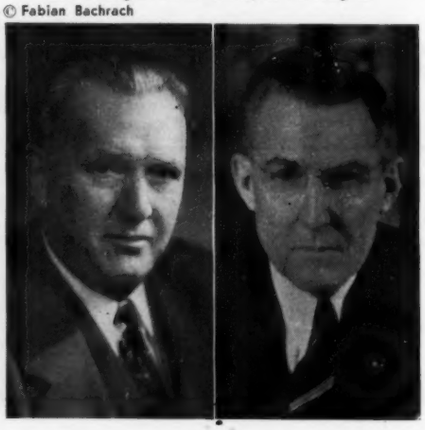


Thomas B. Kimball

THOMAS B. KIMBALL has been appointed assistant manager of refineries of Sinclair Refining Co. Mr. Kimball has been associated with the petroleum industry for nearly 27 years with Shell and Sinclair interests. His first assignment with Sinclair was in the research and development department at East Chicago, Indiana, where he was in charge of the cracking division and of the process engineering and development of light-oil processes. In 1943 he was transferred to the New York office as technical assistant to the vice president of manufacturing, which position he held to date. During the past several years he has developed numerous patents on light oil treating and on thermal and catalytic cracking.

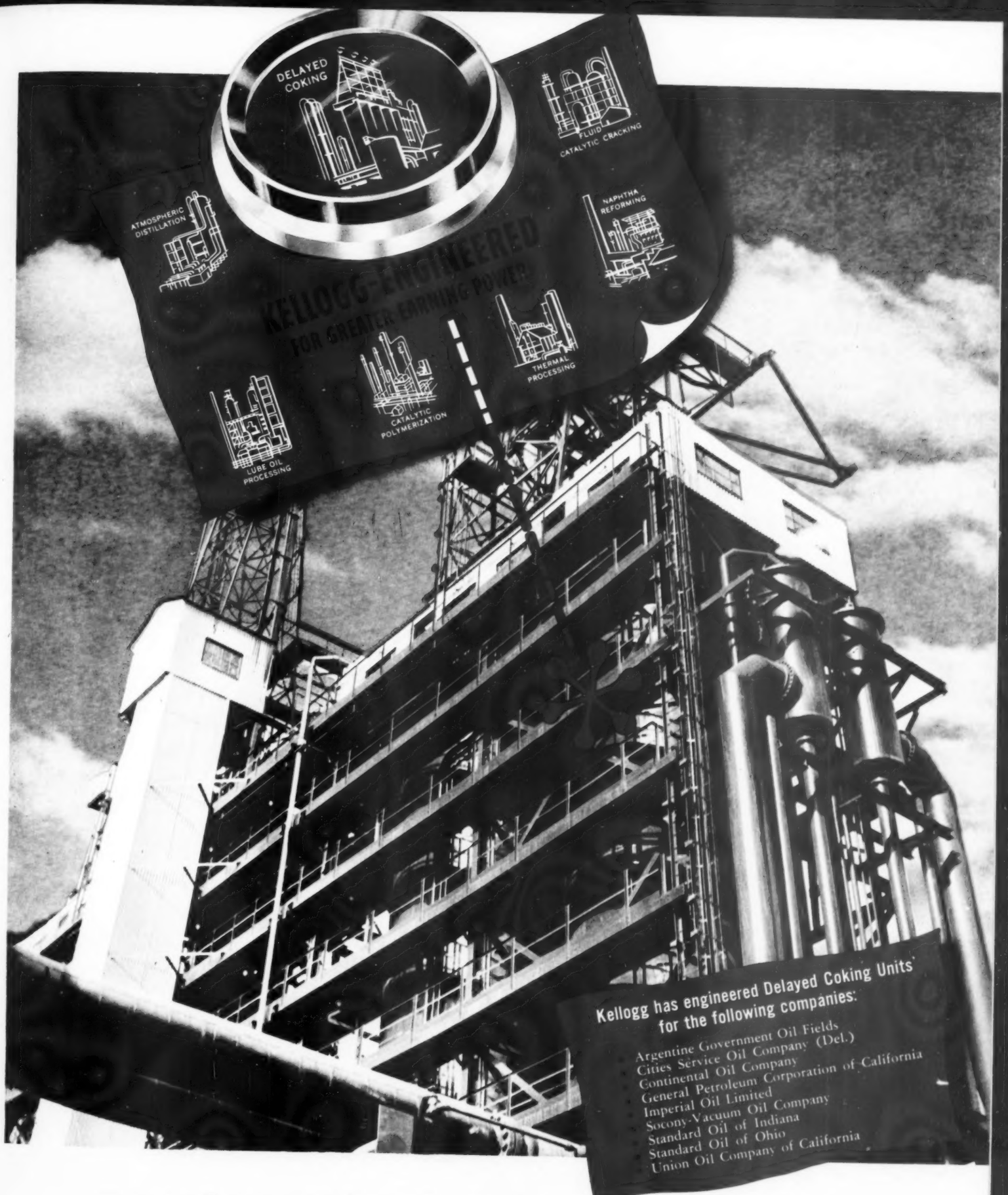
J. J. LEU has been elected vice president of the services and operations department, and Marc L. Schwartz vice president in charge of the sales department of the American Oil Co. Mr. Leu's career in the petroleum industry began in 1914 when he joined Standard Oil Co. (Ind.) as a record clerk. In 1937 he became assistant general manager of the northern division, American Oil Co., and in 1949 he became manager of the service departments.

Mr. Schwartz joined the American Oil Co. in 1929 as assistant to the manager of the wholesale sales department, later becoming manager of the department. In 1947 he was promoted to sales manager of the southern region, and two years later became manager of all wholesale sales activities of the American Oil Co. from Maine to Florida.

EMIL J. JANDACEK has been appointed assistant chief engineer of the entire pipeline system of Texas Gas Transmission Corp. He joins Texas Gas after serving for eight years in various engineering capacities with Stone & Webster Engineering Corp. Mr. Jandacek's headquarters will be in Owensboro, Kentucky.

H. WALTER JOHNSON has been appointed manager of Sun Oil Company's insurance department. He succeeds C. Elmer Townsend, retired. Mr. Johnson joined Sun in 1923 and was named assistant manager in January 1938.

ED WRANGLE of Seminole, Okla., has been named superintendent of the new Chico, Texas, gasoline plant of Cities Service Oil Co. He comes to the new north Texas plant from the company's Sasakwa plant in the Seminole, Okla., field where he served as superintendent. In the future E. B. Lord of Seminole will handle supervision of both the Maud and Sasakwa plants, with Lonnie Pitts handling direction of Sasakwa plant operations as assistant superintendent.



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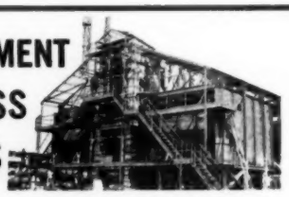
NO LONGER is there any question of the importance of Delayed Coking in the economics of modern refining. And there are three good reasons for this: 1. The softening of fuel oil requirements; 2. The ever-increasing demand for clean catalytic cracking feed; 3. The increasing demand for high quality process coke.

The only question remaining is, "*Who* will build the necessary Delayed Coking capacity?"

Kellogg submits its 70% capacity record for your consideration. There must be definite reasons behind such a commanding position, particularly when it has been maintained over a ten year period.

When you are evaluating Delayed Coking, Kellogg would welcome the opportunity to discuss the specifics of its application to your refinery.

FURNACE DEVELOPMENT IS KEY TO SUCCESS OF KELLOGG UNITS



Today's Delayed Coking is essentially founded upon the efficiency of the furnace itself. Here, the charge stock must be heated to the necessary temperature quickly and then rapidly moved into the coker drums before it "cokes up" the furnace tubes. Thus it is obvious that furnace design is directly responsible for the length of on-stream runs.

It isn't surprising, then, that Kellogg, which has been intimately associated with thermal cracking since its earliest days in the 1920's, and has built literally hundreds of thermal units, should now be designing Delayed Coking units whose runs are exceeding *eight months*. Even then, inspections have shown that units *might have been kept on stream for longer periods without appreciable loss of efficiency.*

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1 THE DEVELOPMENT "TOOLS" —laboratories, pilot plants and recognized specialists to prove and improve processing and equipment ideas.

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3 SPECIALISTS IN EVERY PHASE of design engineering due to the completeness of Kellogg's engineering staff.

4 SPECIALIZED BUYERS backed by the cumulative buying power of the largest company in the business.

5 COMPLETE FABRICATING FACILITIES to make schedule deadlines and to develop workable "firsts" in refinery equipment.

6 CONSTRUCTION KNOW-HOW acquired in completing hundreds of major jobs, plus an ample supply of the proper tools, and the constant development of new money-and-time-saving methods on the construction lot.

7 PRACTICAL OPERATING COUNSEL on all design and construction, achieved through practical operating men working as an integral part of the company.

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A. Neil Lilly

A. NEIL LILLY has been appointed general manager of foreign operations, eastern hemisphere, for The Texas Co. He came with the company in 1933 and has held various positions in this country and abroad. From 1942 to 1945 he served with the U. S. Army Air Forces.

EDWIN S. HALL, a vice president and former general counsel of Esso Standard Oil Co., has retired after 30 years' service with the company. He became an attorney for Standard in 1920 and successively held the titles of general attorney and general counsel. Mr. Hall was elected a director of the company in 1934 and a vice president in 1940. He was also president of Esso Standard Oil Co. of Pennsylvania.

E. L. STAUFFACHER has been appointed assistant to the vice president and manager of Cities Service Oil Company's marketing division. G. C. Richardson, formerly regional manager at Cleveland, is returning to the Chicago marketing headquarters office as general superintendent to succeed Mr. Stauffacher. L. J. Beckman has been appointed Cleveland regional manager.

JOHN R. DONNELL has been elected treasurer of Ohio Oil Co. to succeed Charles H. Smith, retired. Mr. Donnell has been assistant to the manager of production since 1944.

RALPH R. MATTHEWS, executive vice president of Battenfeld Grease and Oil Corp., Kansas City, retired Dec. 31. He joined the company in 1928 after several years with the U. S. Bureau of Mines and Shell Oil Co.

Heads American Iron and Machine

M. G. McCool, Oklahoma City, was elected president and general manager of the American Iron and Machine Works Company at the Dec. 15 meeting of directors. E. E. Rubac was elected vice president and assistant general manager. Other officers elected were: J. A. Gray, Houston, Texas, chairman of the board; V. L. Thomas, Oklahoma City, secretary-treasurer; Cecil N. Cook, Houston, Texas, vice president; and A. J. Farfel, Houston, Texas, assistant secretary. Claude L. Griffin, Oklahoma City, was appointed sales manager.

Bethlehem Appointments

Bethlehem Supply Co. has appointed Fred Parks as division sales manager for the Houston-Gulf Coast area. This area includes all of Bethlehem's operations from New Orleans, La., to McAllen, Texas. J. V. Spalding was appointed division machinery manager, assisting Mr. Parks in the selling and furnishing of engineering specifications of drilling and production machinery.

H. E. Bramston Cook

H. E. BRAMSTON-COOK has been elected a vice president of Oronite Chemical Co., a subsidiary of Standard Oil Co. of California, and R. M. Miilu has been appointed Oronite's eastern sales manager.

Capt. Bramston-Cook, formerly general manager of sales and product development east of the Rockies, will continue in this capacity. He will also handle work in the export field, with the exception of the Far East. He has had approximately 22 years of specialized experience in the petroleum field and was responsible for the major prewar development in supplying petroleum aromatic solvents from west coast crudes for nation-wide industrial consumption.

DEAN M. FOX is the new district superintendent for the General Petroleum Corp. in the Rocky Mountain area. He will supervise both drilling and production activities in Wyoming, Montana and Colorado from Casper headquarters. Mr. Fox is a veteran of 13 years' service with General Petroleum, and since 1947 has been district supervisor of production.

F. R. YOST, manager of the producing department of Stanolind Oil and Gas Co., has been elected a director, increasing the board to seven. A native Texan, Mr. Yost entered the petroleum business as a roughneck with the Yount-Lee Oil Co. in 1934. One year later he joined Stanolind as a rotary floorman at the High Island field on the Texas Gulf Coast. Following successive promotions to drilling superintendent for the production department in 1945 and operating superintendent in 1947, Mr. Yost became manager of the producing department on Feb. 1, 1949.

F. R. Yost

Youngstown Promotes Curtis

Myron S. Curtis has been appointed assistant to the president of The Youngstown Sheet and Tube Co., Youngstown, Ohio, to succeed Roy M. Welch, retired. He brings to the new position 38 years' experience in manufacturing, sales and sales promotion with the company which he joined in 1911. Mr. Curtis was the company's first chief inspector and later was Youngstown district sales manager. In 1929 he was appointed advertising manager and the following year was made manager of sales promotion, a position he has held ever since. Last year he also was appointed manager of the company's industrial development division.

Joins Bethlehem Export

David C. McLaughlin, engineering representative for Bethlehem Supply Company at Dallas, Texas, became oil field engineering representative for Bethelehem Steel Export Corp. with headquarters in New York City on Jan. 2, according to an announcement by S. B. Bash, vice president. Mr. McLaughlin was an engineer-geologist for the old Venezuela Gulf Oil Corp. in the Oficiana and Santa Rosa districts of eastern Venezuela in 1933 and 1934. He joined Bethlehem Supply Co. at Dallas in 1939. Mr. McLaughlin spent three years with the U. S. Navy in the Pacific theatre during World War II. He was released with the rank of Lieutenant Commander.

Rayner Joins National Resources Board

Charles Rayner, formerly petroleum adviser to the State Department and more recently in charge of the Washington office of American Independent Oil Company, has been placed in charge of the petroleum division of the National Security Resources Board. In this capacity he succeeds Col. G. H. Vogel who has been transferred to the post of Quartermaster, Third Army division with headquarters at Atlanta, Georgia.

WILLIAM D. MASON, director in charge of industrial relations, Sun Oil Co., retired Dec. 31 after 45 years in the petroleum industry. He will continue on Sun's board of directors until the annual meeting of stockholders in April. William E. Zimmerman, assistant department manager, succeeds Mr. Mason as director of industrial relations.

UPSHUR EVANS appointment to the newly created post of assistant to the chairman of the board of directors was announced by W. T. Holliday of The Standard Oil Co. (Ohio). Mr. Evans was formerly financial vice president and national executive director of United World Federalists Inc., and during the recent war was General Stilwell's representative at Chiang Kai-shek's South China Headquarters.

Upshur Evans

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TIME WILL TELL
THE GEOLOGRAPH CO. INC

SEARCH FOR PETROLEUM IN FRANCE

(Continued from Page 35)

(SEREPT) with a capital of 1,925 million francs, which has succeeded the Syndicat d'Etudes and has the same stockholders; the Société Nord Africaine des Pétroles, a subsidiary of Gulf Oil Corporation with an initial capital of 1,500 million francs, and the Compagnie des Pétroles de Tunisie, a subsidiary of Shell with an initial capital of 300 million francs.

These two companies have a participation in the SEREPT limited to 35 percent; their main offices will be situated in Tunisia or in France and they will be subject to Tunisian legislation. Tunisia will receive a royalty of 10 percent and will have first call on the production up to 50 percent.

The most notable prospecting effort undertaken on the Moroccan territory is that of the Société Chérifienne des Pétroles, founded in 1929. Its capital today amounts to 3,480 million francs, of which seven percent is held by private interests. The prospecting of its 2,500,000-acre concession was at first marked by a certain hesitation; there was a great divergence of opinion as regards the origin of the oil, the formations in which it would be found and even as to the geological constitution of the region.

Nevertheless a considerable effort was made in the field of geophysical and geological research, the results of which were controlled by more than 500 drilled wells. This work has led to the discovery of small deposits at Tselfat, bou Drââ and Ain-Hamra, which today are on the way to exhaustion, and has allowed a delineation of the geological perimeters: there is here involved the western end of a great trough occupied by a considerable volume of sediment and comprised between the Rif mountains and the northern border of the Hercynien Atlas.

This prospecting work has demonstrated both the presence of porous rock, which may constitute productive reservoirs, and also the existence in these reservoirs of more or less important indications of oil.

The work has received a notable stimulation by the postwar delivery of six modern drilling rigs bought in the United States, which have allowed the rate of drilling to be increased five-fold within two years. The immediate consequence of this increased activity was, at the end of 1947, the discovery and bringing into production the Oued Beth formation. The production of the company was thus raised from 55 barrels daily at the end of 1946 to 151 barrels daily at the end of 1947, 276 at the end of 1948 and 450 during the first half of 1949; most of this production came from Oued Beth. This crude oil, which has an API density of 34°, on simple distillation gives 10 percent gasoline having a very low octane number, 50 percent of gas-oil and 40 percent of heavy fuel oil. It is processed on the spot in a provisional apparatus, the capacity of which limits production to 800 barrels a day.

The work contemplated for the near future, along with development of the production of this formation, comprises exploration of the secondary basin and the Neogene basin of northern Morocco.

Among the other French overseas territories where prospecting work has been undertaken, it will be apropos to make special mention of Gabon and the great island of Madagascar.

In French Gabon, where a large number of oil signs have been observed, geological prospecting began in 1930 and after the war was completed by a gravimetric and magnetic survey. New geochemical and seismic studies are in progress. Two modern drilling rigs, recently put to work, have drilled 15,000 feet up to the end of 1948 in order to verify the geological structure of the basin.

The interest which is attached to the intensification of this work is emphasized by the reorganization, at the beginning of 1949, of the Syndicat d'Etudes et de Recherches, which has been in charge of this work, into a new company, Société des Pétroles de l'Afrique Equatoriale Française, with a capital of 987 million francs (African), of which 60 percent was furnished by the government and the B.R.P.

The western part of Madagascar comprises two sedimentary basins, Morondava, Tulear, covering 70,000 square miles where the surface signs of oil, notably the outcropping of bituminous sands, are rather numerous. Prospecting which began about four years ago with insufficient means, has recently been resumed on a solid geological and geophysical basis.

Geological parties are also at work in Cameroun and New Caledonia.

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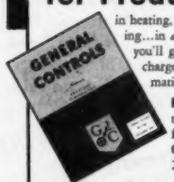

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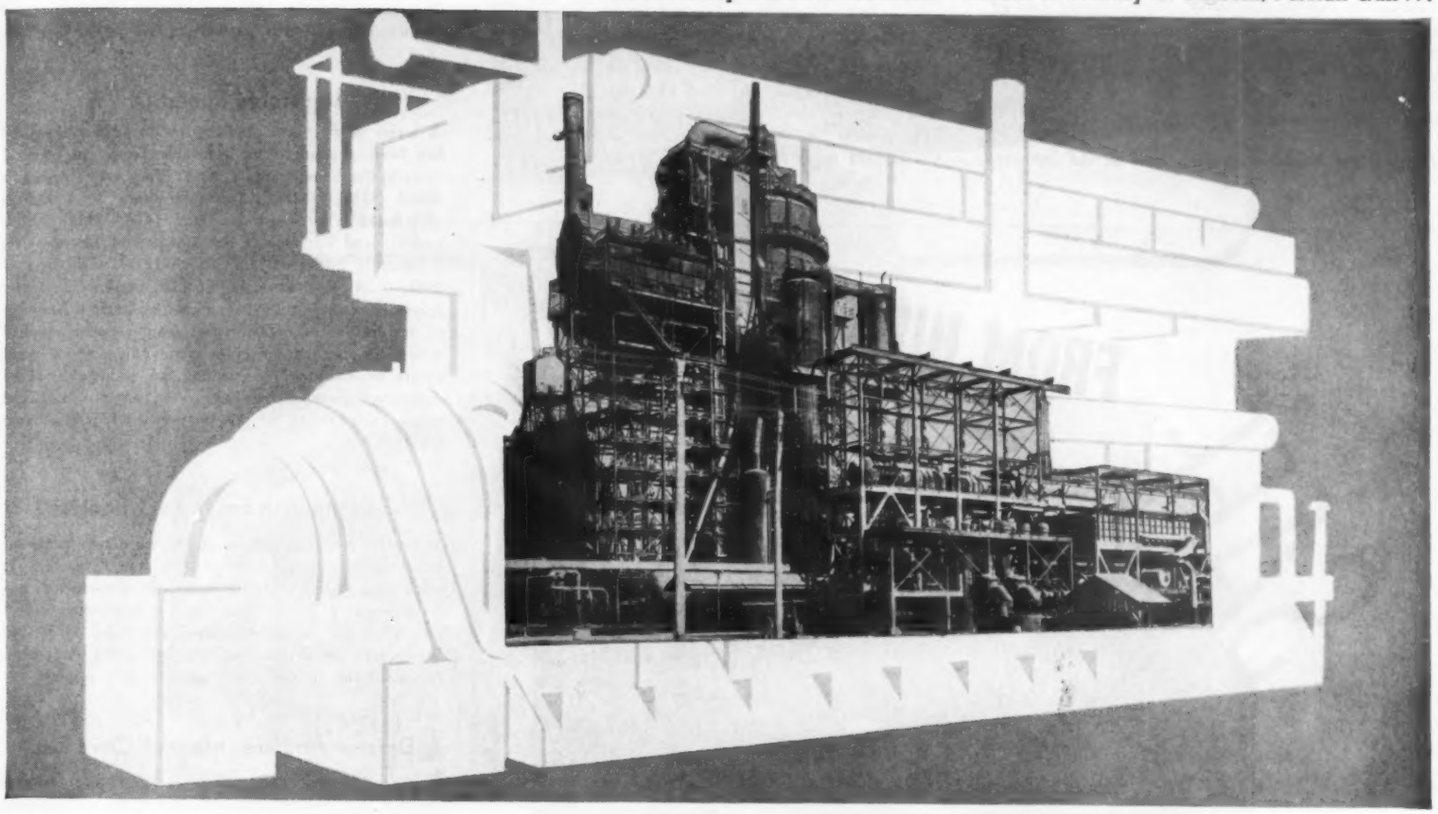

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Sohio Building Big Cracking Unit

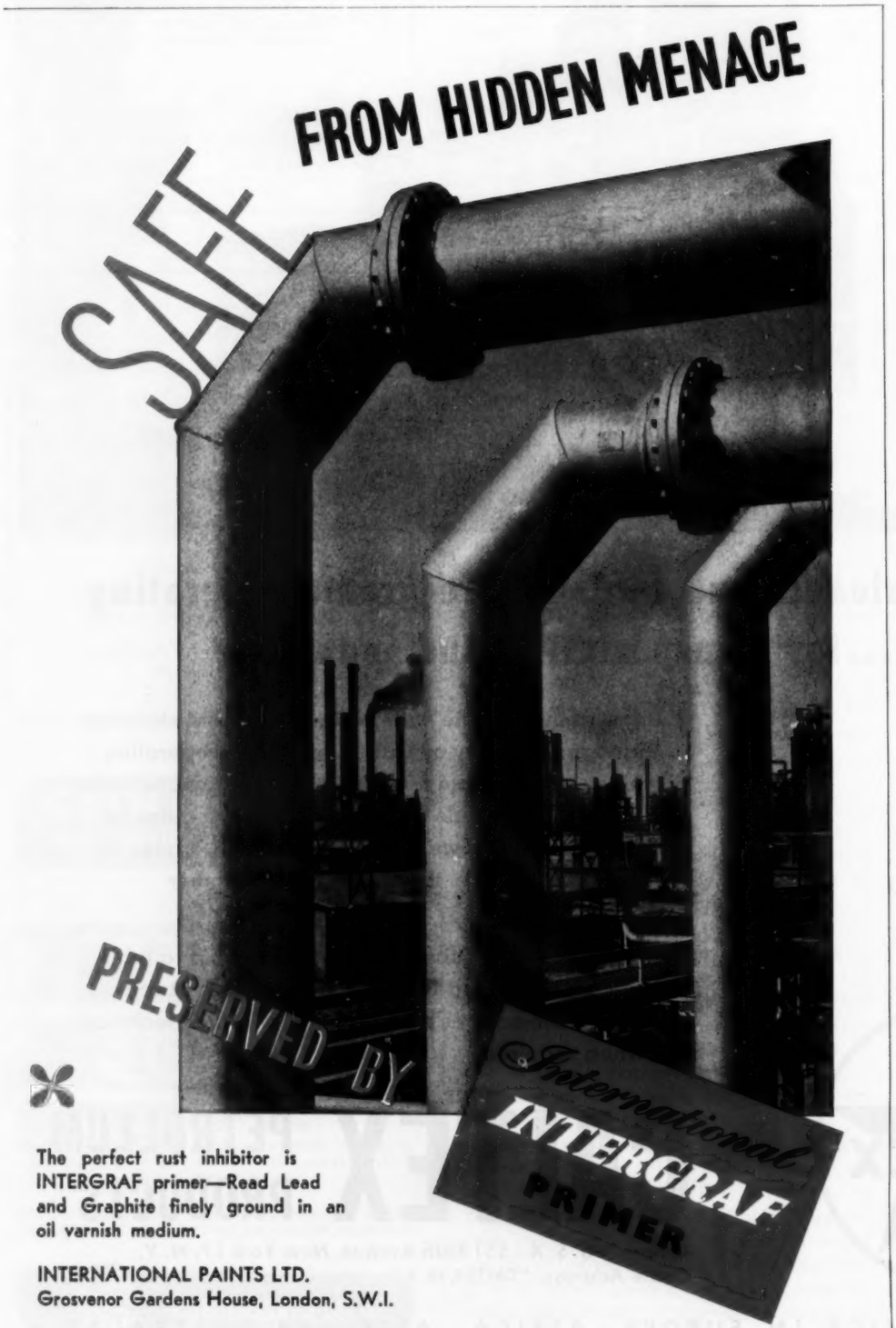
Plans for reconstruction and enlargement of the catalytic cracking facilities of the Cleveland No. 1 refinery of Standard Oil Co. (Ohio) have been completed, according to a recent announcement by E. B. McConnell, vice president in charge of manufacturing.

Erection of the new unit will begin at once and is expected to be completed in about fifteen months. The work of construction will be carried out by the Bechtel Corporation of San Francisco from plans prepared by Sohio's engineering department. The estimated cost of the undertaking is $4,500,000.

The present catalytic cracking unit at the refinery was built in 1944 to produce aviation gasoline, then essential to wartime needs, and has a capacity of approximately 12,000 barrels of feed stock per day. The new plant will provide capacity within the range of 18,000 to 22,000 barrels of feed stock per day. Its construction is part of the $100 million three-year program of Sohio to provide more petroleum products to meet the needs of its marketing territory.

New Company Formed

John E. Eckel, formerly vice president in charge of engineering, Oil Center Tool Co., and Marvin R. Jones, former chief engineer of the same company, have formed The Petroleum Mechanical Development Co. at 3803 South Main Street in Houston. This company has been organized to develop new or improved oil tools and to consult on petroleum mechanical engineering. Mr. Eckel, as president, brings over twenty years of experience in oil equipment engineering with Humble Oil & Refining Co. and Oil Center Tool Co. to the new organization. Mr. Jones, the secretary-treasurer, has had long experience also in oil tool design, working with such companies as American Iron and Machine Works, Hughes Tool Co. and Cameron Iron Works, as well as Oil Center Tool Co.



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Adjustable Speed Drives

A series of five new publications on adjustable speed has been announced as available from the General Electric Co., Schenectady 5, N. Y. They are: Adjustable Speed (GEA-5334); Adjustable Speed ACA Motors (GEA-4883A); Speed Variator (GEA-5335); Electronic Speed Variator (GEA-5336); and Thy-mo-Trol Adjustable Speed Drives (GEA-5337). The first of these, a 24-page, two-color booklet, presents a concise summary of the specific benefits which various branches of modern industry can expect from properly applied adjustable speed. It provides a convenient check list of points to consider in selecting an adjustable speed drive and gives a clear picture of various packaged units, their range of application and performance features.

Earthmoving Equipment Booklet

A booklet illustrated with on-the-job photographs of International diesel crawler and wheel tractors at work on a wide variety of earthmoving operations has been prepared by the International Harvester Export Co., Chicago. Models ranging from the 44 to 140 horsepower are shown with matched allied equipment. Copies of this booklet are available upon request.

Dresser Acquires Magnet Cove Co.

Dresser Industries Inc. has purchased the common stock of the Magnet Cove Barium Corp. of Houston, Texas, for approximately $2,800,000 in cash plus about 17,500 shares of Dresser common stock, it is announced by H. N. Mallon, president of Dresser Industries.

Magnet Cove's major products consist of mineral and chemical compounds used in the preparation of drilling mud, utilizing as its major raw material deposits of bariet at Malvern, Arkansas. The company's manufacturing operations consist chiefly of mining, washing, crushing and bagging.

Plans Products Line

Frontier Refining Company is filing an application with the Nebraska Railroad Commission for a certificate of public convenience and necessity to permit the building of a products pipeline between the Cheyenne, Wyo., refinery and Omaha or Lincoln, Neb. An ultimate capacity of two hundred million gallons per year is proposed, with a six-inch or eight-inch line to terminals at Sidney, North Platte and Grand Island, Nebraska, in addition to Lincoln or Omaha.

X-Ray Microscope

An x-ray microscope has been developed in the laboratories of General Electric which may compete with electron microscopes in the future. The microscope operates on the principle that x-rays can be reflected from polished surfaces, as can visible light, provided that they strike the surfaces at very small angles, almost parallel to the surfaces. It consists of an x-ray tube and a pair of curved mirrors, which the x-rays strike at an angle of less than one-half degree, after having passed through the sample. The mirrors acting in a manner like that of a convex lens with a light beam, bend the rays in such a manner as to form a magnified x-ray image of the sample on a photographic film.

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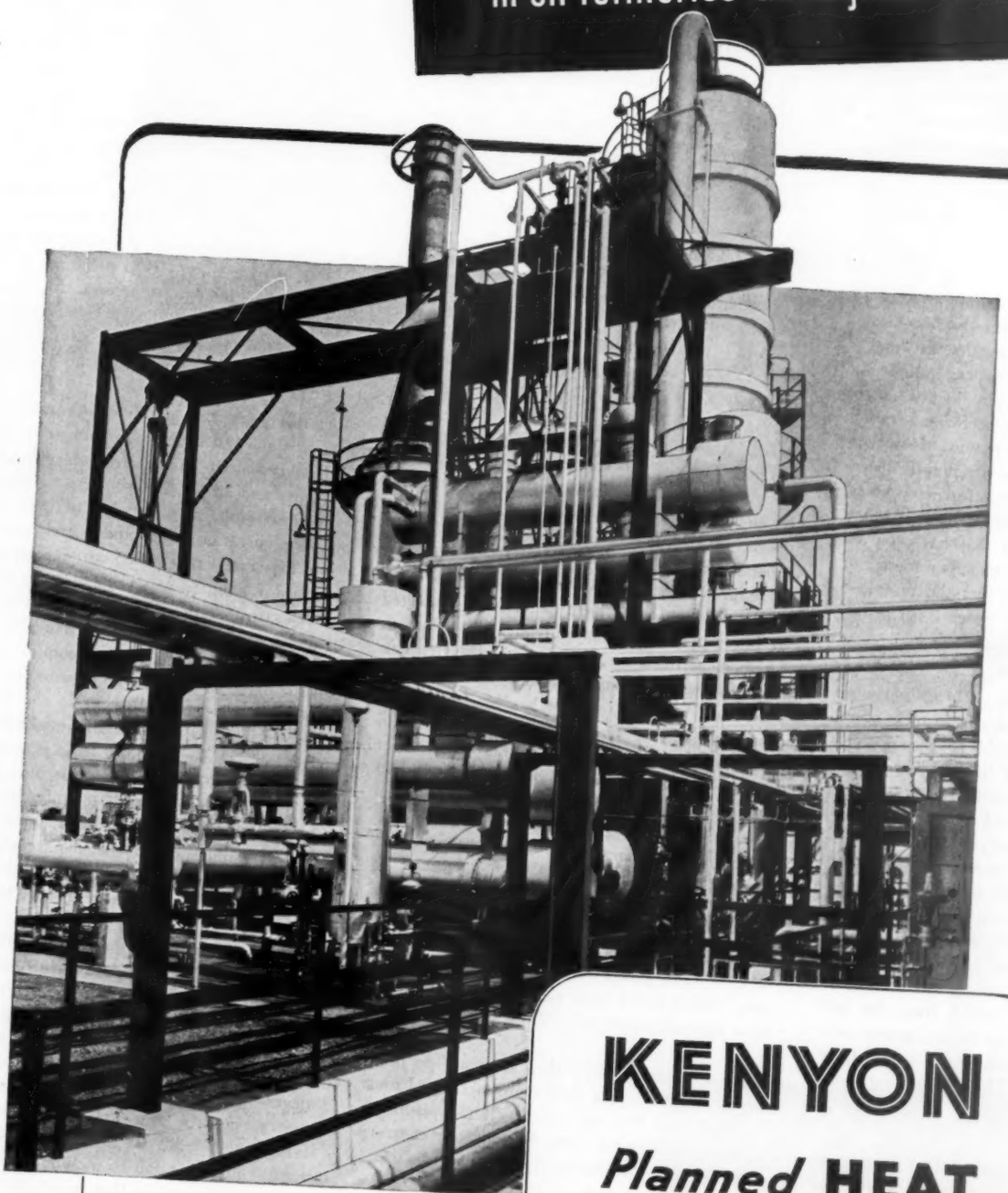

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DRILL STEM TESTING DEFENDED

By Frank E. O'Neill*

THE petroleum industry has so long and so successfully devoted itself to the elimination of operational hazards that it is startling to read some distinctly contrary statements by the safety director of a large oil organization in the mid-continent. Speaking of drill stem tests, this gentleman is reputed to have stated: "Every person connected with the oil field has either witnessed, or heard of, the vast amount of destruction caused in taking such a test. Hundreds of lives have been lost, not mentioning millions of dollars worth of equipment and untold acres of productive land."

That makes the drill stem test sound like a highly hazardous business that scatters death and destruction in its wake, and coincidentally makes the petroleum industry seem a very callous institution that continues, in spite of the awful cost in life and property, to perform a rather simple test in a very dangerous way. However, although that particular phase of oil well operation has been my special interest for many years, I have failed either to witness or to have heard of the succession of disasters that has occurred in the making of drill stem tests. As a matter of fact, my experience indicates just the reverse—that drill stem tests are in general performed with remarkable freedom from accident.

It would appear to me that such a serious reflection on the adequacy and effectiveness of oil field safety engineering should be accompanied by substantiating data, and in this category, I for one, am not at all inclined to accept as evidence what anyone has "heard of." On the contrary, I submit that the analysis of fire and accident causes poses highly complex problems that can only be resolved satisfactorily by qualified engineers, chemists and other technicians, with the full aid of the involved operators. The mere seeing or hearing about an accident that took place during a drill stem test is not admissible proof that the accident resulted from the test itself, or any piece or part of the equipment used in making the test. The point that I particularly seek to emphasize is this: There is nothing about a standard drill stem test that is dangerous.

I am perfectly willing to concede that the gentleman who made the statement quoted at the beginning of this article was actuated by the best intentions in the world. He is, without doubt, an ardent disciple of safe practices and policies, but I feel sure that in this particular instance he was influenced more by his enthusiasm than by the facts. Personally, I would be willing to let the whole matter pass without comment if the statement as it stands were just ineffectual so far as the promotion of further safety measures is concerned and had no secondary undesirable influence.

It is an unfortunate fact, however, that a strongly positive assertion of this sort has all manner of hidden implications that are not immediately apparent to the author of the remarks but are quickly felt by the victims. A blanket indictment of the drill stem test carries with it a coincidental indictment of the apparatus used and the method of its use. That is what brings me to my feet in protest. The formation tester manufactured by my employer has performed thousands of tests under the most widely varied conditions with an almost negligible accident frequency. The manufacture of this device is not an isolated venture carried on by a screwpot inventor. It is a logical, well organized, cooperative development that has engaged some of the finest engineering brains in both the equipment manufacturing and petroleum producing industries. A paramount consideration in every step of this development has been safety.

Safety is built into the basic construction materials. Every joint and every moving part is designed to withstand stresses and strains far beyond anything likely to be experienced. The operating technique has been examined by engineers and safety supervisors in hundreds of large producing organizations, and it has been pronounced safe. I have personally contacted by letter many field superintendents, production foremen, petroleum engineers and others experienced in the supervision or actual making of drill stem tests, and the response has been much the same from all of them. Comments in general run about like these actual quotations: "Never heard of an accident in the oil field due to drill stem testing," by a production manager; "Experience with testing tools anything but dangerous," by a field engineer; "Never heard of an accident due to drill stem testing," by an oil operator; "We will continue to run drill stem tests when a string of pipe may be saved on the outcome," by an operating superintendent; "Have never seen or heard of an accident due to drill stem testing and I have run hundreds of them," by a superintendent of drilling and production.

I am willing to admit that accidents do occur during the making of drill stem tests, but I must reiterate that they are not at all the results of properly performed tests, but on the contrary are a penalty for improper performance. Also I must again insist that the evidence which I have gathered does not support the contention of the articles in question. As a matter of fact, isn't it rather strange, if the drill stem test has been such a dangerous operation, that practically none of the safety organizations has any record of accident frequency? Here is an industry that is known by every student of such matters to be not only acutely safety-conscious but effectively safety-active, and yet it has quite overlooked a hazard that has caused the loss of "hundreds of lives, millions of dollars worth of equipment and untold acres of productive land." As a matter of fact, the total fire and accident record of the entire petroleum industry isn't that bad!

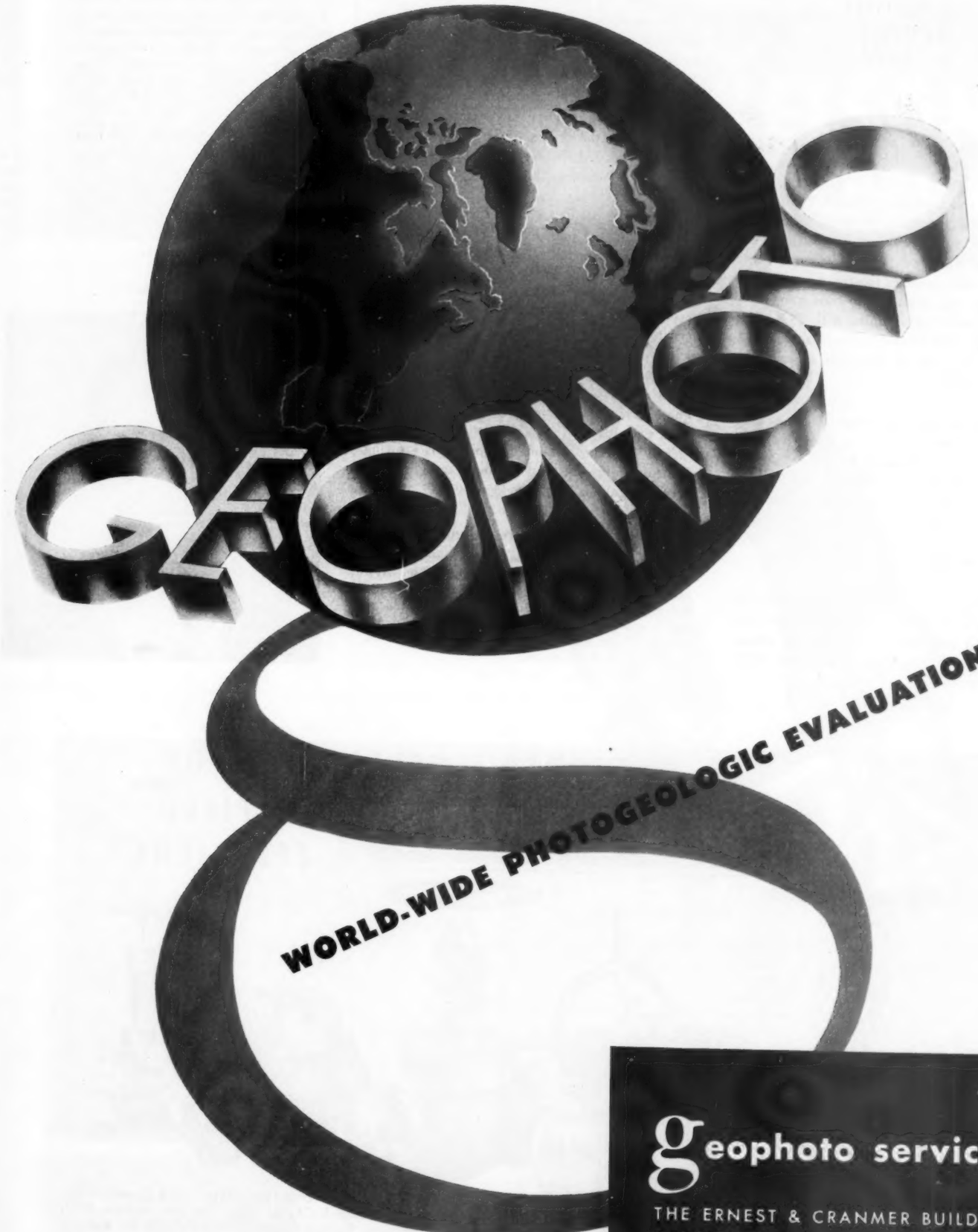
It may be that the gentleman who takes us to task for the devastation that is caused in the making of drill stem tests has failed to time his offering. In other words, perhaps he is talking about what happened in the early days of the industry, before operators knew how to control formation pressures, and when the blowing-in of a well was a natural consequence of ignorance and not a comparatively rare accident as it is today. Every drilling well of any consequence is now equipped with a blowout preventer, and the procedures employed even without the preventer are so designed as to keep pressures in check at all stages of the drilling process. In consqeuence, it is seldom that a well gets out of control, and the accident record of the drilling industry is really something of which to be proud.

At this point I would like to emphasize a sort of fundamental belief that seems to be shared by all experienced fire protection and safety engineers and seems also to be very pertinent to this discussion. It is simply this: Safe operation is sane operation. The experts feel, almost without exception, that when an operation is performed in a logical way with adequate equipment, it is a safe operation. After all, every bit of heavy equipment is dangerous in the hands of a novice. Most of the products of petroleum are dangerous in the hands of people who are not familiar with their characteristics. But we in the oil business are supposed to be especially qualified in some phase of it or we shouldn't be in it, and certainly it is rational to assume that the men who carry on drill stem tests are thoroughly familiar with the techniques and that the manufacturers are just as familiar with the requirements of the equipment involved. With these two main conditions for safety met, safety is sure to follow.

In conclusion I would merely say that of its own volition the oil industry has instituted the most stringent measures to find and remove every known hazard and to guard both its property and the lives of its workers. The whole safety structure has been built up by ceaseless vigilance and never-ending effort. The fight against death and destruction has been well organized and gratifyingly successful. It is inconceivable that such a program could fail to include some revision of a common procedure that is the cause of a "vast amount of destruction" and an appalling toll of human life.

The test, indeed, has in all probability prevented many an accident by disclosing what might be expected in the way of formation pressures, so giving the engineers some advance information on which to base subsequent operations. The records of this organization show less than 10 accidents to personnel attributable directly to testing in something over seventy-five thousand tests.

* M. O. Johnston Oil Field Service Corp.



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OIL INDUSTRY PROGRESS IN BRAZIL

(Continued from Page 39)

crude, probably from the Middle East or Venezuela.

In November also arrangements with William G. Hetzel were concluded for the project of an oil duct between Santos and San Paulo, to be exploited by the state-owned Santos-Jundiai Railway. The project provides for two trunks of 10 and 18 inches, and branches to consuming centers within a radius of six miles, with 28.8 miles of pipe in all. The revised estimate amounts to $7,560,000 U.S., and all materials must be on site by June 1950.

At the end of the year a government commission left Brazil for Stockholm to negotiate the purchase of tank ships. Tenders have been invited for vessels of 14,500 to 18,000 tons, with cargo capacity of 120,000 to 150,000 barrels, and for shallow-draft vessels to carry from 11,000 to 17,000 barrels. A national oil fleet of 180,000 tons is to be assembled.

The project for a new petroleum law, which has been before the Chamber of Deputies since February 1948, is expected to come up for debate early in 1950. The existing law, dated 1938, nationalized all branches of the oil industry and restricted exploitation to companies in which the capital was subscribed, and the management exercised, exclusively by native-born Brazilians. The new project, which conforms to the 1946 Constitution, reserves transportation and refining for domestic consumption to companies in which 60 percent of the shares are held by Brazilians. Refining and distribution for exportation, however, may be exploited by firms organized in the country with foreign capital and controlled from abroad. The project was approved by the National Security Council, but has been strongly opposed by Nationalists and Socialists. In December the Deputy appointed to report on it to the House Committee of Industry and Commerce recommended its rejection and submitted an alternative. In the latter he proposes the organization of a society, with mixed state and private capital of $270,000,000 U.S., to develop oil reserves and exploit all branches of the industry. The alternative does not appear to have aroused much sympathy. Brazilian investors do not favor "mixed" enterprises, and the opinion is growing that foreign capital must be encouraged in order to accelerate industrial development.

Code Interpretations

The API-ASME committee on unfired pressure vessels has adopted a series of interpretations of the API-ASME code for the design, construction, inspection and repair of unfired pressure vessels for petroleum liquids and gases. W. T. Gunn, director of the API division of refining, 50 West 50th Street, New York, is secretary to the committee.

New Multi-Layer Bulletin

A. O. Smith Corp. is preparing a series of bulletins dealing with various specific aspects of multi-layer pressure vessels. The first to be completed is Bulletin No. V-52, "Multi-Layer Manufacture and Assembly." Others will follow soon. Copies are available on request to A. O. Smith Corp., Milwaukee.

Forms Catalyst Division

National Aluminate Corp., Chicago, has formed a catalyst division to produce a fluid-type petroleum cracking catalyst. Sales manager for the new division is Gage Averill, formerly with American Cyanamid Co. Production manager for the catalyst plant is Dr. D. G. Braithwaite, formerly assistant director of research for National Aluminate.

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Guests and speakers at Los Angeles Nomads December meeting. Guests seated, left to right: M. Sawatari, N. Yakamoto, T. Oinomikado, all of Imperial Oil Co. of Japan. Speakers standing, left to right; Jay Gould, Anglo-Iranian Oil Co.; E. C. Brown, Brown Drilling Co.; "Beans" Riordan, National League Umpire (ret.); Charles Blanchet, Richmond Exploration Co. Not pictured, Earl Rees, Patterson-Ballagh Division.

Los Angeles Nomads Meeting

E. C. "Ned" Brown, Brown Drilling Co., spoke on conditions in the Middle East, with special attention to the foreign market for Middle East oil, at the Los Angeles Nomads meeting in December. Jay Gould, active for many years in oil operations outside the United States, discussed the oil situation in the Middle East from the standpoint of the Anglo-Iranian Oil Co. The market for equipment in Latin America was discussed by Earl Rees, Patterson Ballagh division of Byron Jackson Co. He described drilling prospects in Mexico, both as to Pemex and American Independent plans. Richmond Exploration Company's Charles Blanchet, home on leave, described housing and other factors affecting general living conditions for the Americans staying in Latin America.

Stacey-Dresser Moves

Stacey-Dresser Engineering Division, Cleveland, Ohio, is moving its headquarters to Cincinnati, according to an announcement by H. N. Mallon, president of Dresser Industries, Inc. The address will be P. O. Box E (5535 Vine Street), Cincinnati 16, Ohio.

Will Make Swivel Couplings

A company recently organized by two well known California equipment men is Gil Lair Products Inc. Organizers of the company are J. M. Gilmore, president of Standard Machine Works, Pasadena, and Lee J. Laird, formerly vice president of the Chiksan Company and more recently associated with Howard Supply Co. During the past year he has been president of the Los Angeles chapter of Nomads.

Gil-Lair Products Inc. will engage in the manufacture, under exclusive patents, of the All-Flex ball-bearing swivel pipe coupling designed for conveying liquids through pipes which constantly swivel or rotate. The company also makes other types of couplings, rotary and circulating hose, packing units and parts.

Left to right: Lee J. Laird, J. M. Gilmore.

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A. L. Roberts

A. L. ROBERTS has been named general superintendent of Texas Gas Transmission Corporation's pipeline system. He has been active in pipeline work since 1927 when he was connected with the engineering and construction division of the Empire Company in Bartlesville, Oklahoma. He joined Kentucky Natural Gas Corp., a predecessor company of Texas Gas, in 1930 as district pipeline superintendent. H. L. Stowers was appointed chief engineer for Texas Gas. Mr. Stowers joined Memphis Natural Gas Co., also a Texas Gas predecessor, in 1937 as assistant chief engineer. In 1944 he was promoted to chief engineer, and in June of this year, as work started on the new Texas Gas Texas-to-Ohio pipeline he took over the duties of chief engineer.

To Build Three TCC Units

Plans for three more Thermofor catalytic cracking units to be constructed at refineries in Buffalo, N. Y., Beaumont, Texas and Brooklyn, N. Y., have been announced by the Socony-Vacuum Oil Co. Inc. These three are in addition to the four other units announced several months ago for Socony-Vacuum refineries at Trenton, Mich., Augusta, Kans., and at Beaumont. The TCC units with moving bed catalysts replace existing Houdry fixed-bed units. They will provide an increase of 50 percent over the present 10,000-barrel-per-day capacity of each Houdry unit for a total throughput of 105,000 barrels daily.

Construction of two more of the TCC units of simplified design by the Standard Oil Co. of Ohio at its refinery in Cleveland, Ohio, has been licensed also by Socony-Vacuum.

Launches New Super Tanker

The super tanker, S. S. Sovac Comet, built for Tankers Navigation Company, Inc., was launched at Sun Shipbuilding and Dry Dock yards on Jan. 5. Mrs. C. Francis Beatty, wife of a director of the Socony-Vacuum Oil Co., christened the vessel. S. S. Sovac Comet is the fifth large oil carrier to be delivered to Tankers Navigation Company, Inc. It is more than 600 feet long and the cargo capacity is nearly 10,000,000 gallons.

Temperature Indicators

A new line of temperature indicators for industrial and laboratory use has been announced by General Electric's meter and instrument divisions. Included in the line are cold-end compensated thermocouple thermometers for measuring temperatures up to 3000 F and resistance thermometers for temperatures up to 300 F.

Return From Europe

M. E. Montrose, vice president of sales, Houston; W. H. Siems, export sales manager, New York, and R. G. Roberts, London representative of Hughes Tool Co. returned recently to their respective headquarters after an extended business trip through England, France, Netherlands, Germany and Italy.

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By Morris Muskat

Chief of Physics Division
Gulf Research & Development Company

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Here is a thorough study of the physical principles underlying the production of oil and gas from underground reservoirs. All basic types of oil production mechanisms are discussed, including the solution gas drive, water drive, and gravity drainage. Operating problems and characteristics of condensate reservoirs are fully covered, as are the physical concepts and principles of oil field performance. Many examples of actual oil field operation demonstrate producing mechanisms and operations. Recent advances in the field of oil production are dealt with. Numerous diagrams and graphs summarize the theoretical developments.

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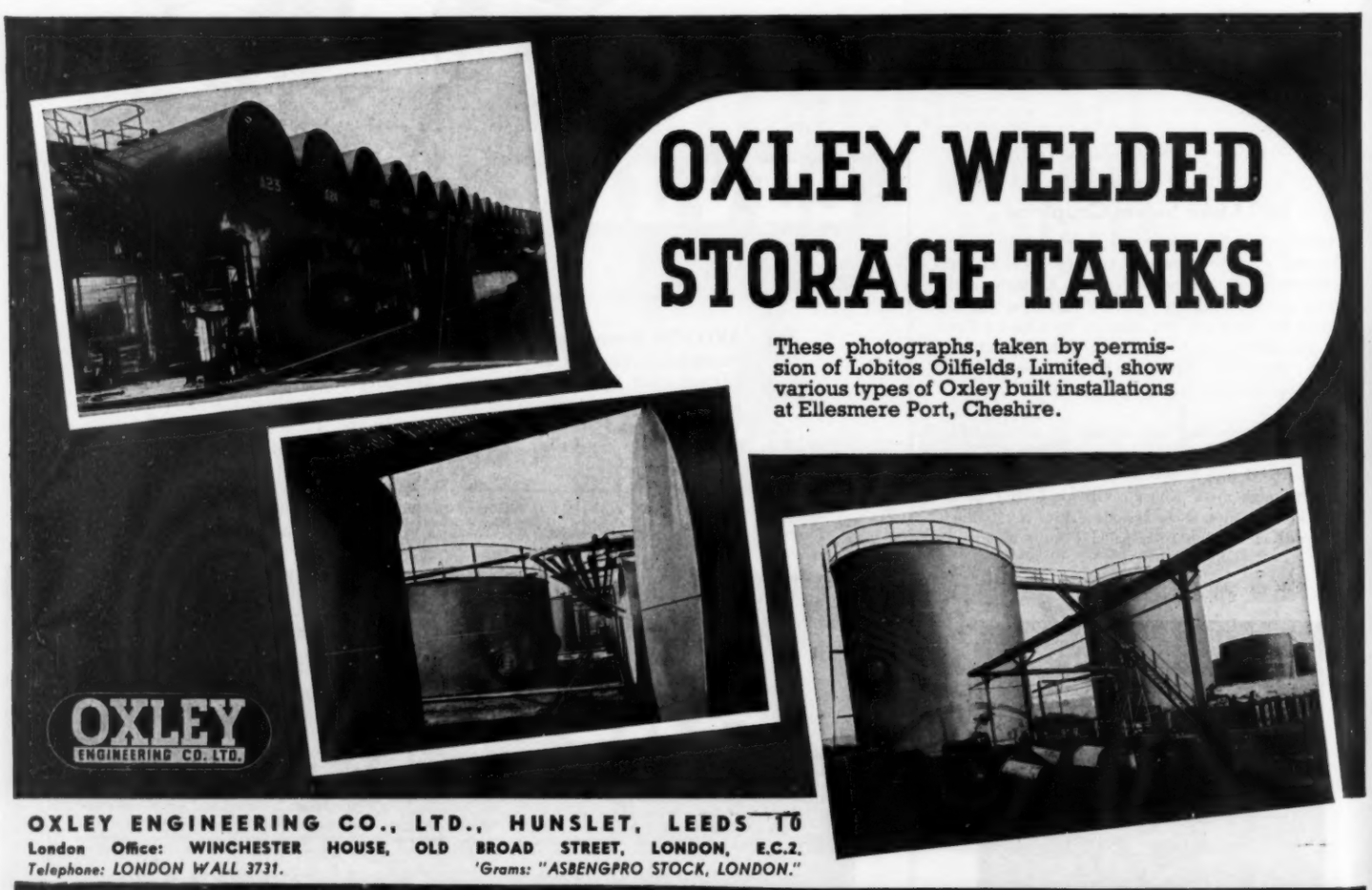
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ECA'S RELATION TO INTERNATIONAL OIL PROBLEMS

(Continued from Page 31)

sentatives of the United States and the United Kingdom and as to some of which differences of opinion have developed relate to trade policies and practices. As to these the position taken by the State Department as it is generally understood here may be stated as follows:

(1) There should be no more "restrictive bilateral trade agreements," and those now in effect (the British-Argentine contract as an example) should be brought to an end.

(2) Currency restrictions should be modified to give American companies the same right to sell for sterling and other currencies, and the same right to use those currencies as have European companies.

(3) ECA dollars should not be used for purchase of petroleum products by Britain when the products are to be resold for dollars.

(4) Every barrel of oil, wherever produced, has a certain dollar increment. The question of whether ECA dollars should be allowed to cover this increment and the oil then sold without at least collecting the dollar increment, should be explored.

(5) ECA funds should be withheld if they are to be used for duplicating American-owned foreign investments.

(6) An arrangement should be worked out whereby American companies would be allowed dollar exchange to cover minimum dollar costs plus a reasonable return on their investment for stockholders.

(7) Actions should not be permitted that will force American companies into the position of having to accept cartel agreements in order to survive.

New York Nomads Elect

At the January meeting of the New York chapter of Nomads, officers were elected for the coming year as follows: Henry J. McAdams, president; Howard B. Book, vice president; E. T. Landgraff, secretary; Fred J. Jobst, assistant secretary; Maurice F. Delano, treasurer; John D. Evans, assistant treasurer; Kenneth D. Demarest, sergeant-at-arms; Eugene R. Smoley, assistant sergeant-at-arms; Val R. Wittich Jr. and Russell D. Heath, regents.

Boiler Bulletin

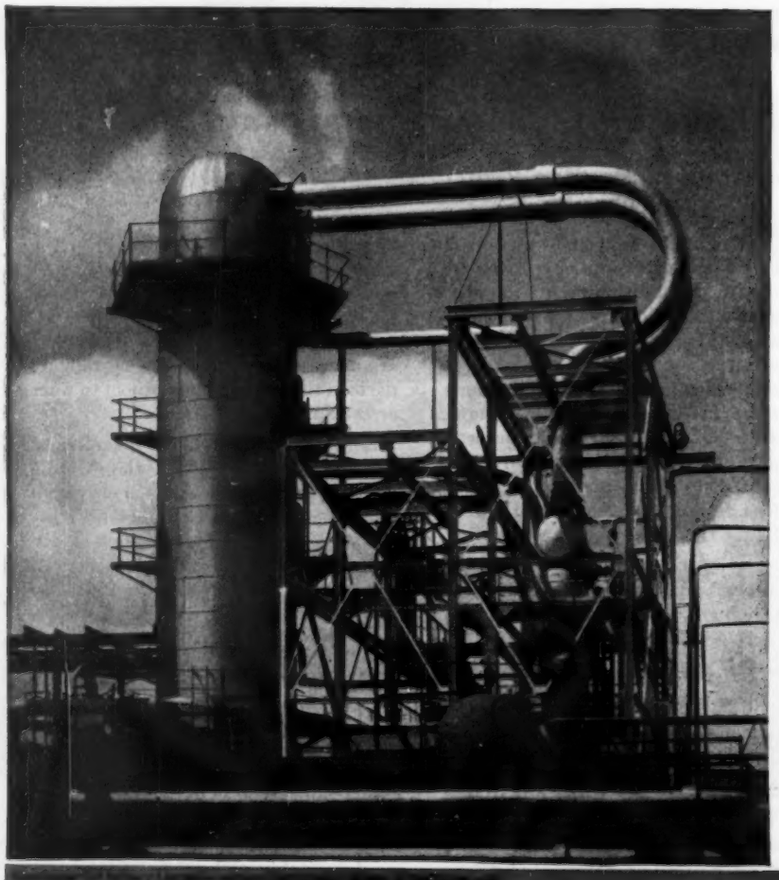
Henry Vogt Machine Co., Louisville, Ky., has published a booklet dealing with its Class VL Bent Tube Boilers which is available on request. The booklet gives details of the Class VL, which has a basic design permitting its adaptation to limited space requirements when necessary.

Octane Ratings Higher

Average octane rating of regular price gasoline in the United States in the summer of 1949 was 81.9 (Research), according to the semi-annual survey conducted by the U. S. Bureau of Mines during which 2,911 samples were examined in 200 cities. A year previously the average sample tested 80.1 octane. Premium gasoline average was 88.0 compared with 86.1 in 1948.

SANFORD M. WAGNER has been elected vice president in charge of sales of Ethyl Corp. He succeeds Harry W. Kaley, vice president, who will continue as a director and member of the executive committee. Mr. Wagner, formerly in charge of sales operations in the western region, has been with Ethyl for 24 years.

Sanford M. Wagner



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H. H. Dinkins, Jr.

H. H. DINKINS, JR., has been appointed vice president of William M. Barret, Inc., consulting geophysicists of Shreveport, La. Mr. Dinkins was with the Electric Bond and Share system in various sales, public relations and corporate capacities for more than 20 years. He resigned as secretary of the parent company in New York last year and went into his own business in south Louisiana. He was retained as a consultant by his organization for some months prior to joining the company as vice president.

F. F. ELLIOTT has been elected assistant treasurer of Standard Oil Co. (Ind.) He joined the company in 1930 as traveling auditor. After various assignments he became assistant to the treasurer in 1948.

DR. HERMAN ELKAN RIES JR., head of the physical chemistry department of Sinclair Refining Co. research laboratories at Harvey, Ill., who will be the second chemist to be awarded the $3,000 Ipatieff prize in chemistry, was honored by a dinner at Chicago recently. The prize is for outstanding chemical experimental work in the field of catalysis or high pressure. It will be presented at the meeting of the American Chemical Society in Houston, Texas, next spring.

Dr. Ries has contributed to the understanding of how the catalysts work with precise, characterizing data defining adsorption - desorption isotherms. He has shown the difference in the area, structure and surface composition of catalysts by low temperature nitrogen adsorption and by adsorption of stearic acid molecules dissolved in benzene. This work has shed light on the correlation of physical characteristics with the performance and utility of catalyst preparations.

Speakers at the recent dinner were: Dr. Vladimir N. Ipatieff, director of the Ipatieff High Pressure and Catalytic Laboratory at Northwestern University; E. E. Isom, vice president of Sinclair Refining Co., who served as toastmaster; E. F. Nelson, vice president of Universal Oil Products Co.; Dr. Simon H. Bauer, Cornell University; and Dr. Leonard E. Olson, coworker of Dr. Ries.

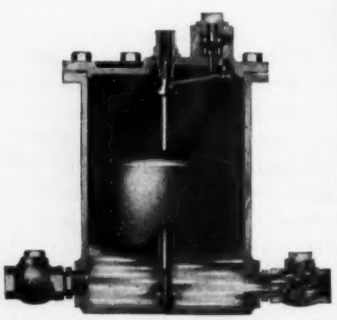
Coal to Oil Research Discontinued

The Standard Oil Development Co. has discontinued its joint research with the Pittsburgh Consolidation Coal Co. at Library, Pa. The work was to determine the application of the fluidized solids technique to the gasification of both coal and coke as a step in the synthesis of oil products from coal. Operation of the pilot plant at Library started Oct. 10, 1948, when an oil shortage seemed possible. With the return of a more nearly normal increase in oil demand and with greatly increased world petroleum supplies, it now appears that the need for converting coal into oil is not pressing, thus allowing time for further basic small-scale research.

A. E. PECORE has been appointed general superintendent of Humble Pipe Line Co. The appointment was one of nine promotions announced by O. Q. Lomax, vice president and general manager. Mr. Pecore joined Humble in 1919 and has been their chief engineer since 1945.

A. E. Pecore

This patent



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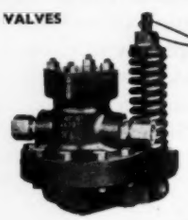

Designed by experts to give a minimum sympathetic pressure drop with variations of upstream pressure. Maximum flow with minimum working drop and absence of pressure creep with no flow. Leaflet No. 43 gives full details.

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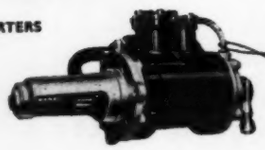
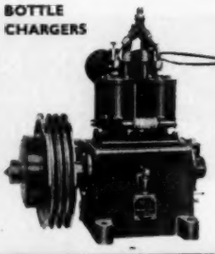


Air Starting Motors for Compression Ignition Engines and Gas Turbines. Robust, reliable, easy to install and economical in operation. For use with engines from 20-BHP to 750-BHP. Fire risk eliminated. Leaflet No. 32 gives full details.

BOTTLE CHARGERS



Single-stage, heavy duty Bottle-charging Air Compressors for pressures up to 400 lbs p.s.i. Displacement range 2.4—8.7 c.f.m. Machined from finest materials to interchangeable limits. Multi-stage Compressors up to 30 c.f.m. Leaflet No. 41 gives full details.

Technical advice on pneumatic problems gladly given on request.

SPECIALISTS IN COMPRESSED AIR EQUIPMENT & HIGH PRESSURE RAM PUMPS

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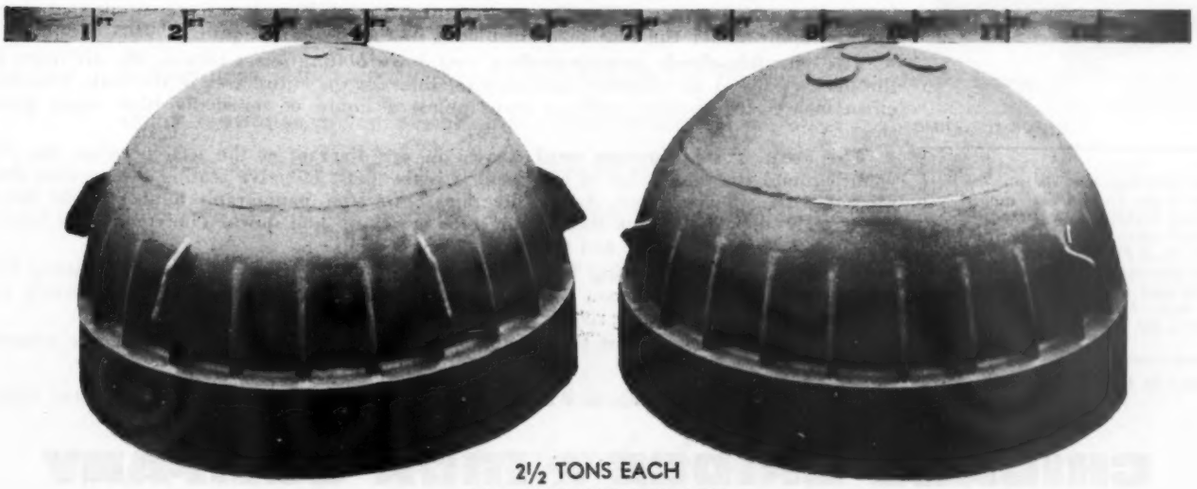
UP TO 8 TONS EACH IN WEIGHT



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Keep Losses Small from Large Storage Tanks

The latest development *in floating roof design is the Horton Seal shown above. This highly efficient seal is now standard construction on all Horton-Double Deck Floating Roofs. Improvements like this are typical of the benefits you gain from dealing with a company that has been building floating roofs for 27 years.*

** Registered in U. S. Patent Office*

with the Horton* Double-Deck Floating Roof

Whenever you use large fixed-roof tanks to store crude oil or refined petroleum products you're the loser . . . because the expansion and contraction of the vapor in the tank leads to Large evaporation losses. When you store the same products in tanks equipped with Horton Double-Deck Floating Roofs, these losses are greatly reduced. Here's why:

- **The elimination of the vapor space** reduces *breathing* losses and prevents *filling* losses. Since this roof floats directly on the surface of the liquid, there is no vapor space in the tank. *Breathing* losses are reduced as there is no air-vapor mixture under the roof to expand and escape through the vents when the temperature rises. *Filling* losses are eliminated since there are no vapors under the roof to be displaced by the incoming liquid.
- **The double-deck construction** cuts down *boiling losses* because the air space between the decks serve as an effective insulating medium for the entire area of the tank. This insulating effect insures that boiling will not occur unless a liquid of unusually high vapor pressure is stored.
- **The improved Horton seal,** shown in the diagram at the left, *prevents the escape of* vapor around the outer edge of the deck. It is the most effective sealing device ever developed for use with a floating roof. As the diagram shows, the pantagraph hangers hold the sealing ring snugly against the tank shell as the roof moves up and down. The continuous fabric closes the space between the deck and the sealing ring.

The use of Horton Floating Roofs is not limited to new tanks. If you have existing fixed-roof tanks whose shells are in good condition, you can transform them into vapor saving units by equipping them with floating roofs.

For complete details about the Horton Double-Deck Floating Roof, write our nearest office for Bulletin B.

Above: 139,300-bbl. oil storage tank built for the Mene Grande Oil Company at Puerto La Cruz, Venezuela.

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Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela

DOUBLE DUTY PLUS

WITH HUGHES FLASHWELD TOOL JOINTS

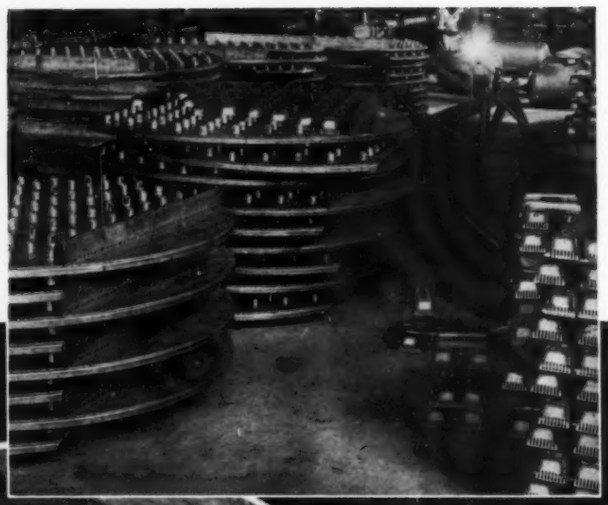
Performance records show that Hughes hard-faced Flashweld Tool Joints have, in many territories, given double the service obtained from other tool joints. In some localities as much as triple service has been noted . . . This is another Hughes "Engineered Solution" to reduce the expense and inconvenience of replacing worn tool joints.

HUGHES TOOL COMPANY
HOUSTON, TEXAS

Standard of the Industry

Precision

IN BIG THINGS TOO



Stainless steel bubble trays and caps being installed in *stainless* clad fractionating tower.

Lummus

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